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from the Original Picture of Antonio Velasquez.

TRAVELS through SPAIN,

WITH A VIEW TO ILLUSTRATE THE

NATURAL HISTORY

AND

PHYSICAL GEOGRAPHY OF THAT KINGDOM,

IN A SERIES OF LETTERS.

Including the moſt intereſting Subjects contained in the Memoirs of

DON GUILLERMO BOWLES, and other Spaniſh Writers.

INTERSPERSED WITH HISTORICAL ANECDOTES.

ADORNED WITH

COPPER-PLATES AND A NEW MAP OF SPAIN.

WITH

NOTES and OBSERVATIONS relative to the ARTS and deſcriptive of MODERN IMPROVEMENTS.

Written in the Courſe of a late TOUR through that KINGDOM

By JOHN TALBOT DILLON,

KNIGHT and BARON of the Sacred Roman Empire.

Lo unico a que puedo aſpirar, es a la gloria de ſer el primero que ha intentado una deſcripcion fiſica dc eſte pais.

DON GUILLERMO BOWLES.

DUBLIN:

Printed for S. PRICE, W. and H. WHITESTONE, T. WALKER, W. GILBERT, C. JENKIN, W. HALLHEAD, L. WHITE, C. TALBOT, and P. BYRNE.

MDCCLXXXI.

DP
34
.D58

TO

The Right Honourable

THOMAS LORD GRANTHAM,

LATE

His Majeſty's Ambaſſador at the Court of

M A D R I D.

This Work is moſt reſpectfully INSCRIBED,
By his LORDSHIP's
moſt obliged, and
moſt humble Servant,
JOHN TALBOT DILLON.

PREFACE.

AT my return from Italy in the year 1778, I once more viſited Spain, and traverſed the whole kingdom. * This journey afforded me the greater pleaſure, from not only being verſed in the Spaniſh language, but having made many friends and acquaintance during my former reſidence in that kingdom, beſides being no ſtranger to their manners and cuſtoms; which circumſtance greatly contributed to increaſe my amuſement, and render my travels far more agreeable than they would have been to a perſon in a leſs eligible predicament.

On my arrival at Madrid, the ingenious and elaborate work of Don Guillermo Bowles,† firſt fell into my hands. This valuable treatiſe is deſigned as an introduction to the *Natural Hiſtory and Phyſical Geography* of the

 kingdom

* This was my third voyage to Spain.

† Introduccion a la hiſtoria natural y a la geografia fiſica de Eſpana, por Don Guillermo Bowles. Madrid, 1775, 4to.

kingdom of Spain, for the execution of which the author was very well qualified, having been employed many years by his Catholic Majeſty in viſiting mines and other purpoſes tending to the improvement of that kingdom, in different branches of mineralogy, and other uſeful arts. Upon the peruſal of this production, it occurred to me that at a period when *Natural Hiſtory* is ſo much cultivated, a more perfect acquaintance with a country, which had hitherto in this reſpect almoſt eſcaped philoſophical enquiry, would meet the approbation of an Engliſh reader; more eſpecially as we might be induced to expect from ſuch a writer, abundant variety of accurate information, that could not be offered by any common inveſtigator: particularly when the many inconveniencies of bad roads, and other embarraſſments, that offer themſelves perpetually in that kingdom, are conſidered. I have therefore availed myſelf of this work as my chief guide, with reſpect to the principal objects of natural hiſtory, without being a mere copyiſt in every minute detail; but on the contrary, ſuch original remarks are offered as

I flatter

I flatter myſelf will not be unacceptable to the candid reader.

We are informed by Mr. Bowles, that having caſually (in 1752) met with at Paris, Don Antonio de Ulloa, now an admiral in the Spaniſh fleet, he was induced by this gentleman to enter into the ſervice of Spain, and that he ſoon after ſet out for that kingdom to receive his inſtructions, and to put them into execution. In this commiſſion he was aſſociated with Don Joſeph Solano, who in 1773, was appointed governor of St. Domingo; Don Salvador de Medina, who died at California, whither he went to make obſervations upon the tranſit of Venus; and Don Pedro Saura, an advocate of Madrid. The two former gentlemen were naval officers and well known by their literary abilities and travels.

The firſt object that engaged Mr. Bowles's attention was an inſpection into the quickſilver mine of Almaden, in La Mancha, at that time greatly neglected, though a place of the utmoſt conſequence to the Spaniards, as they extract from the cinnabar ore of that mine,

the major part of the quickſilver that is requiſite for the working of ſilver mines in America.—Mr. Bowles relates that he ſet out for Almaden on the 17th of July, 1752, and having with great attention viſited the mines, he offered new propoſals to the Spaniſh miniſtry, in which was contained a more eligible proceſs than that which had been adopted for extracting the quickſilver, which was certified by experiments made on the ſpot, in the preſence of the king's officers, which received the approbation of government, and ſerved to fix him in their ſervice. Several years after this firſt expedition he continued his progreſs through moſt of the provinces of Spain, of which he has given rather a deſultory, though curious account, which he laid before the public, and publiſhed at Madrid in 1775, dedicated to his catholic majeſty Charles the third.

In the letters which I now preſent to the public, I have included moſt of the obſervations and remarks of Mr. Bowles in the courſe of his various journies, from the year 1752 down to the preſent time, which were read with great applauſe by the Spaniards, and bought

bought up with ſuch eagerneſs, that in 1778 no copies were to be found. A tranſlation was ſoon after made into French by the viſcount de Flavigny, who has every where literally followed the original text, without any additional note or obſervation: * in the progreſs of a work of ſo extenſive a nature, which compriſes ſuch a variety of ſubjects, we could not reaſonably expect that Mr. Bowles, as a foreigner, and more particularly at his advanced age, could ſet before the public, in the metropolis of Spain, ſo elaborate a performance, without the aſſiſtance of a native perfectly acquainted with his maternal language, till now ſo little introduced in philoſopical reſearches, though extremely copious and expreſſive.

Acccordingly we find no leſs a perſon in the literary world than the ingenious and erudite Don Nicholas de Azara, the preſent Spaniſh agent at the court of Rome, the reviſor of this work; but notwithſtanding this extraordinary aſſiſtance, there remain many obſcure paſſages

* Introduction a l'hiſtoire, naturelle et a la geographic phyſique de L'Eſpagne traduit de l'original Eſpagnol de Guillermo Bowles, par le Vicomte de Flavigny. Paris, 1775. 8vo.

paſſages in different parts of the text, which neceſſarily render an exact tranſlation extremely difficult, as well as tedious and diſagreeable. Some paſſages are merely local, and would therefore afford little or no entertainment to an Engliſh reader. We find moreover, that in his introduction he is compelled, from a deficiency of expreſſion applicable to his ſubject, to enter into tedious details. The ambiguity of the Spaniſh language perplexes him, and throws a cloud over his meaning. After this he further tells us, that he confines himſelf to no kind of order or method; one chapter treats of Valencia, the next of Aragon, another of Biſcay, Catalonia, or the Eſcurial, and what is ſomewhat ſingular, the thirtieth chapter preſents us with his firſt journey from Bayonne into Spain. Judging it expedient to avoid ſuch confuſion, I have endeavoured to arrange his materials in a proper manner; and have accordingly divided this work into two parts. The firſt compriſes the journey to Madrid, by the way of Navarre, then I enter into a deſcription of the northern parts of Spain, which includes many remarkable objects in Caſtile, Aragon, and Biſcay.

Biſcay. In the ſecond part, departing from Madrid, I traverſe the provinces of Eſtremadura, Andaluſia, Grenada, Murcia, Valencia, and Catalonia; and though many of theſe diſtricts have been the immediate objects of my obſervation, I ingeniouſly acknowledge that the chief remarks, with regard to the natural hiſtory of thoſe provinces, are from Mr. Bowles's valuable memoirs; where I have differed from in opinion, my objection is thrown into a note; and where I judged extraneous matter was introduced, it is ſuppreſſed; upon the whole, if I can derive the merit of giving theſe ſheets an Engliſh dreſs, or afford any kind of novelty by enlivening the text, I ſhall be ſatisfied in having compaſſed my deſign; more eſpecially, if the literati ſhould indulge me with the opinion, that I have offered them any thing deſerving their attention, which has not appeared before in print, occaſioned by the dearth of reſearch in a country ſo rich nevertheleſs in materials, that Mr. Bowles juſtly calls it "A Virgin Land."

There are, I flatter myſelf, ſome parts of this book, which cannot, in any reſpect, be conſidered as borrowed from Mr. Bowles's work:

work: in thoſe parts the hiſtorian and the antiquary may probably meet with ſuch detached pieces, as have hitherto eſcaped their obſervation. I muſt acknowledge that I am likewiſe indebted to the works of the celebrated Don Antonio Ponz, ſecretary to the royal academy of San Fernando at Madrid, whoſe travels through Spain have met with univerſal applauſe and recommended him to the royal favour. As the extenſive circulation of Ponz's works induced Mr. Bowles not to quote from them, I have been prevailed upon to avail myſelf of them, judging they would be agreeable to the Engliſh reader, and have endeavoured to blend the quotations with the text, in ſuch a manner as I deemed would render them the moſt acceptable: my deſign being merely intended as an eſſay to afford a guide to future travellers. It is offered to the public in the flattering expectation that it may ſtimulate more capable travellers to inveſtigate the ſubjects it treats of with greater judgment and accuracy. A ſummary account of the mineral waters of Trillo is introduced with a ſimilar view. It is ſelected from the judicious treatiſe of Dr. Ortega, F. R. S. and I am indebted

debted to the obſervations of the late Don Joſeph Quer, his Majeſty's Surgeon, for what is offered on the virtues of the Perennial leaved Strawberry tree.

If it ſhould be urged that I have taken too great liberties with Mr. Bowles's text, let it be remarked, I have invariably prefixed his name at the head of each letter, any part of the contents of which is borrowed from him, to acknowledge fairly my obligation. I have likewiſe endeavoured to do juſtice to his ideas as far as the great variation of idioms would allow; it being as diſtant as poſſible from my intentions to depreciate in the ſmalleſt degree, the extraordinary merit, which muſt impartially be aſcribed to his uncommon talents. To what I have ſaid I muſt ſubjoin that it never was my intent to produce a tranſlation of his book; of which many curious pieces are omitted relative to *platina*, the Mexican mines, and other miſcellaneous matter. On the whole I have aimed at catching the quinteſſence of his book. I have ventured to communicate it to my countrymen for their inſtruction, benefit, and entertainment. How far

far I have ſucceeded, I leave to the candid, the intelligent reader; but ſhall venture to ſay with Wentworth Dillon, Earl of Roſcommon,

> The genuine ſenſe intelligibly told,
> Shews a tranſlator both diſcreet and bold.

It now behoves me to apologize for the many defects and imperfections that will preſent themſelves to the eye of criticiſm in the courſe of peruſing this work. Should my ſtyle appear cold and inanimate when I climb the bleak ſnowy mountains of Aragon and Biſcay, how much more muſt I dread langour and torpidity in the fruitful plains of Andaluſia and Granada; or amidſt the flowery lawns of captivating Valencia. But thus ſituated at the bar of criticiſm, I truſt myſelf to the candour of my jury, the impartial public; let me plead in defence of any defects in language, a long abſence from my native country, which however afforded me great ſatisfaction, more particularly at the Court of Vienna, from the extraordinary favours I had the honour to receive there from two ſucceſſive emperors.

It yields me a moſt flattering retroſpect to repaſs in my memory, the various friendly offices I received from many diſtinguiſhed perſons, during my tour through different parts of Spain, and alſo the aſſiſtance of ſome of my friends in England, in the execution of this deſign. I hope my learned friend, Dr. Withering, will pleaſe to accept my ſincereſt acknowledgements for his very liberal aſſiſtance and obliging reviſion of this work. I am further particularly indebted for many communications to a Gentleman, whoſe long reſidence in Spain, gave him the beſt opportunities of information, equal to his kind diſpoſition to promote literary reſearches there, and to whoſe friendly aſſiſtance the firſt hiſtorian of the age has expreſſed ſuch particular obligations.

The reader need not be ſurprized that I have not engaged in politics, naval or military operations: they were foreign to my ſubject, which leads not to ſpeak of fleets or armies, or the efforts of contending princes, no more than of national characters. The reſearches of nature alone, and the admiration of providence in their diſcovery, afford an ample field

field for the philoſophic traveller! If I have ſometimes expatiated on the qualities or excellence of Spaniſh productions,* I hope, nevertheleſs, it will not be thought, that I mean to leſſen or feel leſs warmth for the innumerable advantages of my own country, wherein, if we have not the rich fruits of the ſouthern climes, we enjoy ſo many other eſſential benefits, ſuperadded to the greateſt abundance of every neceſſary, every convenience of life, as cannot fail, from our inſular ſituation, to render us a moſt happy people. Thus even ſuppoſing for a moment we grant to other nations every advantage of a luxuriant climate, or that the Spaniard lives in ten degrees of more indulgent ſkies;

'Tis Liberty that crowns Britannia's iſle,
And makes her barren rocks, and her bleak mountains ſmile.

ADDISON.

BIRMINGHAM, April 15, 1780.

* Even the great Linnæus, ſpeaking of the natural advantages of the climate of Portugal has ſaid, Bone Deus! Si Luſitani noſcent ſua bona naturæ, quam infelices eſſent, plerique alii, qui non poſſident terras Exoticas. See Linnæus in epiſtola die. 12. Februarii, 1765.

TABLE

TABLE of CONTENTS.

PART I.

LET.		PAGE
I.	*DIVISION of the kingdom of Spain* —	1
II.	*Itinerary from Bayonne to Pamplona, and from thence to Madrid. A mine of ſal gem at Valtierra deſcribed.* —— —— ——	6
III.	*Natural hiſtory of the grana kermes, or ſcarlet grain.*	18
IV.	*The method of making ſalt-petre in Spain.* ——	33
V.	*Of the Merino ſheep.* — — ——	47
VI.	*Inconveniencies ariſing from the Merino ſheep and the partial laws of the Meſta.* — —	59
VII.	*Miſcellaneous obſervations made at Madrid, with ſome account of the royal cabinet of natural hiſtory.*	68
VIII.	*Deſcription of the palace and gardens of Aranjuez.*	85
IX.	*The baths and mineral waters of Trillo.* ——	92
X.	*The royal ſeat and gardens of St. Ildefonſo.—City of Segovia.* — —— ——	114
XI.	*Departure from Madrid for the city of Burgos.* —	121
XII.	*Remarkable objects on the road from Burgos to the provinces of Alaba and Guypuſcoa, as far as Irum, the laſt town on the frontiers of Spain towards France.* —— —— ——	134
XIII.	*Of the iron ore of Mondragon in Guypuſcoa and famous Toledo blades.* — ——	142
XIV.	*Environs of Reinoſa, ſource of the river Eero.—Intended canal of Caſtile.* —— ——	149

XV. *Na-*

XV. *Natural hiſtory of the Spaniſh plant* gayuba, *or perennial leaved ſtrawberry-tree.* — — 154
XVI. *Deſcription of the lordſhip of Biſcay and its products.* 163
XVII. *Reflections on the genius and character of the Biſcayners.* —— — — 172
XVIII. *Deſcription of the town of Bilbao and manners of the inhabitants.* — — — 182
XIX. *Strictures on the injudicious method laid down in the Spaniſh ordinances for the propagation of timber.* 188
XX. *Deſcription of the iron mines and forges at Sommoroſtro in Biſcay.* —— —— 197
XXI. *Obſervations on the copper mines of* La Platilla *in the lordſhip of Molina.* — — — 207
XXII. *The ſource of the Tagus and its environs deſcribed.* 217
XXIII. *Mine of cobalt in the valley of Giſtau, in the pyrenees of Aragon.* —— — 223
XXIV. *Obſervations on an alum mine near the town of Alcaniz, in the kingdom of Aragon.* — — 234
XXV. *Remarkable depoſitory of foſſil bones, near the village of Concud in Aragon.* — — 238

PART II.

LET. PAGE
I. *DON Guillermo Bowles inſpects the quickſilver mine of Almaden, by order of government.—His new method of extracting the quickſilver from the ore of that mine.* — —— 247
II. *Itinerary of Don Guillermo Bowles continued from Almaden to the city of Merida in Eſtremadura.* 266
III. *Natural hiſtory of the locuſts that ravaged the province of Eſtremadura, in the years* 1754, 1755, 1756, *and* 1757. —— —— 274

IV. *Of*

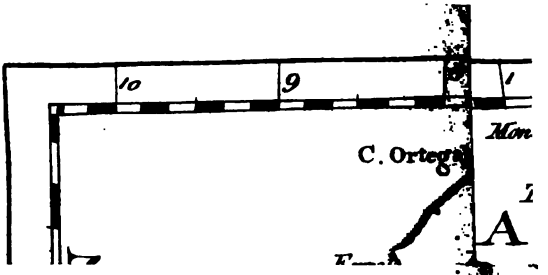
IV. *Of the barren and wretched diſtrict of Batuecas in Eſtremadura.* —— —— 288
V. *The convent of Juſte in the Vera of Plaſencia, famous for the retreat of the Emperor Charles V.* — 295
VI. *Further obſervations made by Don Guillermo Bowles, in the courſe of a tour from Almaden to the ſilver mine of Guadalcanal.* —— —— 301
VII. *Deſcription of the famous ſilver mine at Guadalcanal in Eſtremadura.* —— —— 307
VIII. *Remarkable objects in the courſe of another tour from Guadalcanal to the city of Seville.* —— 320
IX. *Extraordinary qualities of the river Tinto and copper mine of that name, in its neighbourhood.* — 330
X. *A tour into the kingdom of Jaen, the lead mine of Linares, unfortunate fate of Macias the poet.* 336
XI. *Journey from Merida to Malaga.* —— — 344
XII. *The country deſcribed between Malaga and Cape de Gat.* —— —— —— 354
XIII. *Excurſion from the city of Granada to Cordova and Anduxar in Andaluſia.* —— —— 362
XIV. *Obſervations made in a progreſs from Cadiz to Carthagena.* —— —— 369
XV. *The face of the country deſcribed between Carthagena and Alicant.* —— —— 381
XVI. *Road from Alicant to the city of Valencia.* — 390
XVII. *Obſervations made in the city of Valencia and its environs.* —— —— 398
XVIII. *Journey from Barcelona to the mountain of Montſerrat.* —— —— 406
XIX. *Singular mountain of foſſil ſalt near Cardona in Catalonia.* —— —— — 415

XX. *Ob-*

XX. *Obſervations on the roundneſs of pebbles in the beds of rivers.* —— —— —— 420
XXI. *Deſcribing the hot wells at Caldas in Catalonia, and thoſe of Caldetas, near the city of Mataro.* 430
XXII. *Remains of antient volcanos in Spain.* — 434
XXIII. *Return to Valencia and Caſtile.—Mine of ſal gem at Mingranilla.—Source of the river Guadiana.—Mine of Antimony near Santa Cruz de Mudela in La Mancha.* —— —— 439
Appendix. — — — — 449

LIST of PLATES given in this WORK.

FRONTISPIECE, *Charles the IIId. king of Spain, in the robes of the new order of Carlos Tercero, inſtituted the 19th of September, 1771.*
Map of Spain to face letter the firſt.
Plate. I. *The great ant bear.* — — — 80
II. *The creſted falcon.* — — — 84
III. *The cathedral of Burgos.* — — 132


10
9
1
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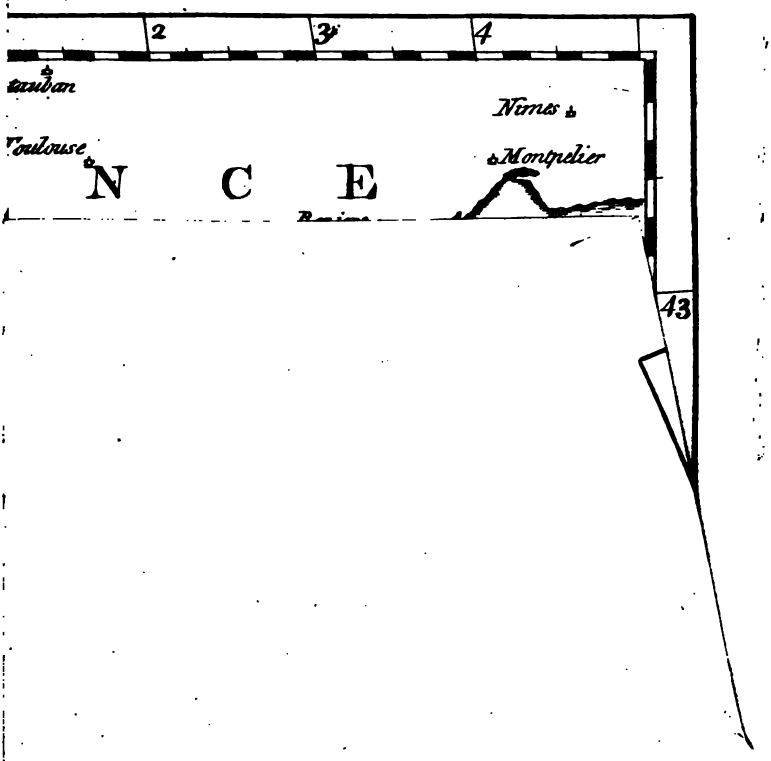
A


2
3
4
Nimes
Montpelier
N C E
43

TRAVELS through SPAIN;

WITH A VIEW TO ILLUSTRATE THE

Natural Hiſtory and Phyſical Geography

OF THAT KINGDOM.

PART I.

LETTER I.

Diviſion of the kingdom of Spain.

THE dominions of Spain are generally claſſed by their writers in the following order. The kingdom of Spain, conſiſting of Old and New Caſtile; the kingdoms of Leon, Arragon, Navarre, Granada, Valencia, Galicia, Seville, Cordova, Murcia, Jaen, and Majorca; the principalities of Aſturias, and Catalonia, the provinces of Eſtremadura, Guipuſ-

coa, and Alava, and the lordſhips of Biſcay, and Molina: they are bounded by the Cantabrian ocean, or bay of Biſcay, on the north, by the Pyrenean mountains and the Mediterranean towards the eaſt; by the ſtreights of Gibraltar and the Mediterranean, which divide it from Africa, on the ſouth, and by the great Atlantic ocean on the weſt: lying between 36 and 43 degrees of north latitude, and between 8. 22. longitude, reckoning from the iſland of Ferro, the moſt weſtern of the Canary iſlands. * The Pyrenean mountains are the higheſt in Spain, extending from the ocean to the Mediterranean, ſeveral others branching out, as from their root, ſuch as mount Idubeda now called Montes de Oca, the Orbion, Moncayo, the Puerto de Pajares, or paſs from Caſtile to Aſturias, the Puerto de Guadarrama, which ſeparates the two Caſtiles, that of Molina, of Cuenca, of Conſuegra, of Alcaraz, of Segura, of Cazorla, and the Montes Marianos now called the Sierra Morena: † the

* Deſcription de la provincia de Madrid, por Thomas Lopez. Madrid, 1763, 12mo.

† *Sierra* is a general name in Spain for all wild diſtricts whoſe rugged appearance ſeems to reſemble the notches of a ſaw (which is *Sierra* in Spaniſh). Of theſe places the Sierra Morena in Andaluſia is one of the moſt extenſive and bleak. Tranſlated literally it anſwers to our Engliſh word, Black-Heath.—The inhabitant of ſuch a country is called *Serrano*, and if the diſtrict is ſmall, it is called *Serrania*.

the Puerto del Rey, ‡ which commands the communication between Caſtile and Andaluſia, and the Puerto del Muradal, where lies that famous paſs called las Navas de Toloſa, celebrated for the victory obtained there in 1212 over the king of Morocco, and other paſſes of leſs note.

Amongſt the rivers, the Ebro has its ſource near Fontibre, ſix leagues from Aguilar del Campo, paſſes by Logrono, Viana, Calahorra, Tudela, Zaragoſſa, Mequinenza, and Tortoſa, and a little lower falls into the Mediterranean at the Alfaque iſlands.

The Guadalquivir has its ſource in the Sierra de Segura, paſſes by Beas, Baeza, Andujar, Cordova,

‡ The word *Puerto* is applied to paſſes from one province to another where duties are paid. I could not help ſmiling to read in a modern geographer, that *Ordunna*, (becauſe there is a *Puerto* there) has a good harbour, when it is an inland city ſeven leagues from Bilboa. J. Barrow's geog. dict. 2 vol. fol. 2d edition reviſed and corrected, 1763.

At many of theſe *Puertos* there are ludicrous duties eſtabliſhed, as for example, at the *Puerto del Rey* in Sierra Morena a ſingular toll is paid for monkeys, parrots, negroes, and guittars unleſs played upon at the time: married women unleſs in company with their huſbands, or producing certificates;—viz. for any monkey, parrot or ſingular bird, one *real vellon*; a guittar, one *peſeta*; any drum, unleſs the king's, one *peſeta*; a woman as above deſcribed, one *real vellon*; a travelling mule, *one quarto*.

Loxa and Seville, and enters the ocean at San Lucar de Barrameda, receiving in its courſe the waters of the rivers Guadalbullon and Genil.

The Tagus riſes in the Sierras de Albarracin, paſſes by Zurita, Aranjuez, Toledo, Almaraz, Alcantara, Abrantes, Santarem, and Liſbon, where it is three miles broad and enters the ocean, having the tide as high as Santarem, and receiving in its courſe the waters of the Jarama, Manzanares, Guadarama, Alberche, and others.

The Guadiana riſes about four leagues from Montiel in the Laguna Ruydera, and after running under ground appears again near Damiel at the lakes or lagunes called *Ojos de Guadiana*, "the eyes of Guadiana," then paſſes by Calatrava, Ciudad Real, Medellin, Merida, Badajoz, and Ayamonte, where it falls into the ocean, after running for ſome time in Alentejo, in Portugal, and ſeparating that kingdom from Spain, having Caſtro Marin of Portugal on the weſt, and Ayamonte on the eaſt.

The Duero riſes in the Sierra of Orbion and paſſes by Soria, Almazan, Oſma, San Eſtevan de Gormaz, Aranda de Duero, Roa, Simancas, Tordeſillas, Toro, Zamora, Miranda de Duero, Lamego, and enters the ocean at Oporto, receiving the rivers Ereſma, Adaja, Piſuerga, Ezla, Agueda, and others.

The

The Minho has its ſource in Galicia near Caſtro del Rey. It runs South Weſt and paſſes by Lugo, Orreniſe and Tuy, after which it divides Galicia from Portugal, and falls into the Atlantic at Caminha.

Other ſmaller rivers are alſo worthy of notice ſuch as the Segura, Guadalaviar, Lobregat, Caya, Vidaſo, Tinto, Guadalate, &c.

Spain may be ſaid to enjoy a temperate and healthy air, neither ſo cold as the northern regions, nor ſo burning as the ſcorching heats of Africa, and abounds in cattle, game, fowl, corn, wool, ſilk, wax, honey, excellent wine, brandy, oil, and ſugar, all kinds of fruit and pulſe, aromatic herbs and plants, the fineſt of oaks, quarries of marble, alabaſter, jaſper, and other precious ſtones; mines of ſilver, lead, copper, iron, mercury, antimony, and cobalt: in ſhort every natural advantage tending to the pleaſure and happineſs of mankind.

The territories of Spain are ſaid to contain 25,000 ſquare leagues.* According to returns made to the Count de Aranda in 1768, the general population

* The Spaniſh league is 7680 varras. 17 Spaniſh leagues make one degree, equal to 20 French leagues.

Three Caſtilian feet make one *vara* of Caſtile, whoſe length is about 33 inches Engliſh.

population of the whole, including the Canaries and Mediterranean iſlands, amounted to about nine millions of ſouls. In the year 1778 it was further calculated to be between ten and eleven millions, and ſuppoſed to be increaſing.

LETTER II.

Itinerary from Bayonne to Pamplona, and from thence to Madrid. A mine of ſal gem at Valtierra deſcribed.

QUITTING Bayonne I proceeded on my journey towards Spain,* and travelling through an uneven country, I began to perceive a ſpecies of flaty ſtone which announced the vicinity of the Pyrenees about half a league diſtant. The environs of Anoa are mountainous. The farmers manure the ground with lime to ſow maiz or Indian corn, laying on a greater quantity for wheat, without which it yields nothing, which proves the neceſſity of this method to cheriſh and expand the tough and cold ſoil in mountainous countries.

Half

* The itinerary of Mr. Bowles is ſupported in this letter, with reſpect to natural hiſtory, and further illuſtrated with the hiſtorical part not mentioned by that writer.

Half a league from Anoa a rivulet forms the boundary between France and Spain. The country is covered with fern, which they cut and heap in piles, till it rots and ſerves for manure. In the arable land, and where cattle have grazed, there are two kinds of mint, ground ivy, and other uſual plants. You next paſs a Carthuſian convent at the foot of a high mountain chiefly of quartz, § whoſe ſummit is a rock of purpliſh ſand, and from thence deſcend to the firſt village in Spain called Maya, ſeated in a valley where they have good crops of maiz and turneps, and whoſe ſoil though not calcareous produces equally the ſame kind of plants. Such as the elder, henbane, nightſhade, ſwallow wort, figwort, thornapple, hawthorn and bullace tree. After paſſing the village of Elizondo and traverſing the vale, I aſcended a mountain of blueiſh lime rock with fine beech towards the top, its ſides lined with many other trees, ſuch as elder, hawthorn, and holm. This mountain is one of the higheſt in this country; but in ſpeaking of the plants found here, I only mean ſuch as are ſeen in that part ſtill uncultivated, for where the ground has been opened, and

§ Quartz is a hard vitrifiable ſtone, ſomething intermediate betwixt rock cryſtals and flints or opake vitrifiable ſtones, well known to metallurgiſts, mineralogiſts, and miners. According to Cronſted, it is eaſier to be known than deſcribed.

and near the inn called Venta de Belate, not far from the top of the mountain, being acceſſible to animals, the following plants are to be ſeen, celandine, mint, cuckowflower, crowfoot, plantain, ſowthiſtle, figwort, archangel, dock, arſmart, and two ſorts of maidenhair on the walls, from whence I judge that if a houſe was built on the higheſt and moſt barren mountain, and the ground manured with the dung of animals, we ſhould ſoon perceive the ſame plants that are obſerved in the neighbourhood of villages and in plains, and that it is not a good rule to judge of the height of a mountain by the appearance of plants, if no diſtinction is made between the ſpontaneous ones and the others, elſe we might conclude that the little hill of Meudon near Paris is as high as the Pyrenees.

From the Venta de Belate it is an eaſy deſcent into another vale well cultivated with vines and corn, which extends as far as the city of Pamplona, capital of the kingdom of Navarre. In this vale there is a wood of ſtately oaks, with plenty of box, thorntree, wild roſes and other common plants of cultivated countries. You keep conſtantly on the borders of a rivulet running amongſt round ſandſtone of a purple colour, ſimilar to thoſe on the other ſide towards France. I ſaw the following plants in the plains of Pamplona, on the ſide of the roads, in the fields and the vineyards; two ſorts of eringo, one called the hundred headed

ſort,

ſort, and the other with large leaves, poppy, dock-weed, white horehound, vipergraſs, elder, white gooſegraſs, devilſbit, cinquefoil, croſſwort, henbane, tutſan, agrimony, teaſel, hawthorn, reſt harrow, crowfoot and bullace.

In this plain it is clearly ſeen how the limy rock decays, for in an almoſt perpendicular fiſſure above an hundred feet high, the earth which at firſt ſight and even to the touch appears to be clay, is nothing more than limy earth, mixed with a ſmall portion of clay, the reſult of rotten plants as I experienced with the acid I always carry with me when I travel. The ſame ſort of earth of a blueiſh colour is found near Pamplona, but harder, and ſo very hard in a hill oppoſite to the city, as to deſerve the name of ſtone, diſpoſed in ſtrata with the ſame obliquity as the fiſſure abovementioned, all which proves the decompoſition of the rocks.

Leaving Pamplona, I traverſed a champaign country for two leagues and a half to the mountain oppoſite, which having paſſed, a variety of cultivation takes place. Some limy rocks are ſo barren, that nothing is to be ſeen but butchers broom, a few oaks, juniper, and lavender, for two leagues and a half further, when I arrived at the city of Tafalla; then paſſing an extenſive plain full of aromatic plants, had five leagues to Caparroſo.

roſo. This plain may be thrown into four diviſions, the firſt from Tafalla being olive trees, the ſecond vineyards, the third corn-fields, and the fourth barren, except a few olive trees and ſome corn-fields near Caparroſo, where a hill divides the plain, and now and then, the rounded purple ſtone ſhews itſelf again the ſame as in France.

From Caparroſo I croſſed a high hill where any miner might miſtake the ſtrata of gypſeous ſtone which is only one or two inches thick, for ſpar, but you may dig as deep as you pleaſe, and never find any thing but gypſum, which is very ſeldom ſeen where there is mineral. The country is every where barren and miſerable, a perfect deſert without water, and nothing but roſemary, lavender, and a few ſtarved oaks. After quitting this wretched diſtrict a fertile plain opens to the eye, ſupplied by wheels with water from the Ebro, and here I ſaw the tamariſk, which is a beautiful plant when in flower.

From Caparroſo it is four leagues to the Ebro in a plain bordered by a chain of hills from eaſt to weſt, compoſed of limy earth mixed with gypſeous ſtone, ſometimes in ſtrata, granulated, or in maſſes, white as ſnow. This chain extends about two leagues, and towards the middle, where it is the higheſt, ſtands the village of Valtierra: about half way up, there is a mine of foſſil common ſalt, which

which being tranſparent and reſembling chryſtal, goes by the name of Salgem, and is ſeen above ground where the ſhaft is made at the entrance of the mine. About twenty paces within, one obſerves that the ſalt, which is white and abundant, has penetrated into the very beds of gypſeous ſtone. This mine may be about four hundred paces in length, with ſeveral lateral ſhafts, upwards of eighty paces, ſupported by pillars of ſalt and gypſum, which the miners have very judiciouſly left at proper diſtances, ſo that it has all the appearance of a gothic cathedral. The ſalt follows the direction of the hill, inclining a little to the north, like the ſtrata of gypſum, being compriſed in a ſpace about five feet in height without variation, and ſeems to have corroded ſeveral beds of gypſum, and marl, and inſinuated itſelf into their place, though much of thoſe ſubſtances ſtill remain.

At the end of the principal ſhaft, the miners have carried out a branch to the right, where the ſaline bed appears to have followed exactly the inclination of the hill, which in that part is very perpendicular: this ſtratum of ſalt deſcends to the valley, and goes on to the oppoſite hill; which regularity deſtroys the ſyſtem of thoſe who pretend that ſal gem is formed by the evaporation occaſioned by ſubterraneous fire. If this was the caſe, the beds would not be undulated in this manner, reſembling

reſembling thoſe of coal at Chamond, near Lyons, in France, or thoſe of aſphaltos,* in Alſace, that follow the elevation and declivity of the hills or vallies, the bitumen often floating on the water when it meets with it. I am of opinion that ſalt grows in the mine like minerals, that coal is the product of foſſil wood, as appears from ſuch remnants as are found in the mines, § and that the aſphaltos

* *Aſphallos* or *Jewiſh bitumen* is ſo called from the lake Aſphaltites or dead ſea in Judea, which riſes up in the nature of a liquid pitch, and floats upon the ſurface of the water like other oleaginous bodies, and is condenſed by degrees through the heat of the ſun; the Jews formerly uſed it to embalm their dead. The Arabs gather it for pitching their ſhips, but the Europeans uſe it in medicinal compoſitions, eſpecially in theriaca, or Venice treacle; alſo for a fine black varniſh, in imitation of that of China. Rolt's dict. of commerce. London, 1761.

The origin of bitumens is an intereſting queſtion, concerning which naturaliſts are not agreed, ſome imagining that they eſſentially belong to the mineral kingdom, and others that they proceed originally from vegetable ſubſtances; we muſt allow this latter opinion to be the moſt probable, &c. See dict. of chemiſtry, tranſlated from the French. London, printed for T. Cadell, 1777.

§ It has been aſſerted that coals being ſometimes produced from clay ſaturated by petroleum, may be found in any place or ſituation where clay or argillaceous ſlate is to be met with, in ancient ſimple or modern ſtratified mountains, as well as on, and in volcanic mountains, and that henceforth

aſphaltos is produced by the water of ſome ſpring. I examined attentively theſe ſtrata of ſalt, comparing them with the matter in which they are embedded. I obſerved the roof to be of gypſum with aromatic plants, then two inches of white ſalt, ſeparated from the gypſum by a few threads of ſaline earth, then, three fingers breadth of pure ſalt, with two of ſtone ſalt, and a coat of earth, next another blueiſh bed, followed by two inches of ſalt; and laſtly, other beds alternately of earth and chryſtaline ſalt to the bed of the mine, which is gypſeous ſtone undulated like the reſt, deſcending to the valley, and riſing on the oppoſite hills. The ſtrata of ſaline earth are of a dark blue, but thoſe of ſalt, are white. This mine is of a great elevation with reſpect to the ſea, for you always go up hill to it from Bayonne, excepting thoſe caſual deſcents which are inſeparable from mountainous countries.

It is a continual aſcent from Valtierra to Agreda, the firſt town in Caſtile, on the top of one of the higheſt mountains in Spain called Moncayo, whoſe rocks ſo decompoſe into earth, as to be covered

henceforth coals will not be conſidered as conſtantly produced from trees, plants, and foreſts, buried by inundations, though many coal mines may have had ſuch an origin. See Ferber's mineralogical hiſtory of Bohemia, page 308, note 5, prefixed to Baron Born's travels through Tranſilvania and Hungary, tranſlated by R. E. Raſpe, London, 1777.

vered with plants, deſerving the attention of a botaniſt, from the great variety thence afforded in the vegetable kingdom. From Agreda the country is well cultivated to Hinojoſo, without any trees or plants, as far as Almeriz, and forwards to Almazan, on the banks of the Duero: examining this diſtrict, which produces wheat and barley, I diſcovered lime rock at a few feet from the ſurface, which for a great extent has an outward coat of ſandy ſoil, with quartz and ſand ſtone totally different from the bottom, which gives it the appearance of a foreign matter brought from a diſtance. The phænomenon is ſingular, and thoſe who are fond of hypotheſes have here an ample field to employ their imagination.

Leaving Almazan, you riſe upon an eminence which affords an extenſive proſpect, the country at a diſtance having the appearance of a plain, the eye not being able to catch the many irregularities of ground. After ſome leagues of uncultivated land, the country improves; three leagues and a half further, I came to Paredes, and croſſing a barren plain, arrived at Baraona, then paſſing over the ſteep hill of Atienza, the confines of the two Caſtiles, I came in five hours to Xadraque, and four leagues further, to Flores; about half way, there is a place where there are hills with great clefts; one evidently ſees they were cauſed by the rains which carry away the limy earth, and that

that all that country had been a plain, for the parts that remain without gullies, have a bottom of hard rock, and in proportion as the water makes its way through, they form gullies; I ſaw ſome juſt beginning, with a likelihood of riſing into hills in the courſe of twenty years; from whence I conjecture, that if ſome hills give way, and crumble into plains, others, in the courſe of time by the motion of waters, gradually form themſelves into mountains.

In paſſing this road, you go through a wood of ſcarlet oak, whoſe leaves are covered with the gall inſect, and on coming out of the wood, find a well cultivated country with vineyards, corn fields, and plenty of lavender, thyme, lavender cotton, and ſage; then paſs by the village of Hita at the foot of a pyramidical hill, rearing its lofty creſt above the others, like a great rock in the ſea, with an old Mooriſh caſtle on its ſummit.

Having croſſed the river Henares you enter a fertile plain with a great deal of ſmall grained ſandy pebble. It is remarkable that on entering New Caſtile, ſtone of this kind is always found, even in hills of limy earth: after paſſing a range of cultivated hills I arrived at the famous city of Alcala de Henares, with an univerſity founded in 1499, by that great ſtateſman Cardinal Ximenez de Ciſneros, who alſo endowed it with a good library,

brary, and printed here, at his own expenſe, the firſt polyglot bible, known by the name of Complutenſian. The univerſity is a handſome ſtructure, Ximenes is buried in the church with an elegant monument, by Dominico of Florence. The medaillon of the Cardinal has been removed from the tomb into the library. Before I leave Alcala, let me entertain you with a ſtory related by the witty Don Antonio Ponz, ſecretary of the royal Academy of San Fernando, at Madrid, in his tour through Spain, who, viſiting the convent of San Diego, belonging to the Franciſcans, thus expreſſes himſelf; "I could not ſwallow two pills that my conductor endeavoured to ram down my throat, which, for his part, he ſeemed to have very eaſily digeſted. He ſhewed me a picture of St. Jerome in a cardinal's robe, and a red hat, which is quite out of character, and wanted to perſuade me it was a portrait of Cardinal Wolſey; after that would make me believe it was valued at fifteen thouſand dollars (£ 2500) though I was ſtartled at the ſum, I did not chooſe to diſpleaſe the perſon who was doing me a favour. I muſt not forget to tell you I alſo ſaw, in a chapel, on the altar of St. Francis, the head of that ſaint in clay, painted to imitate nature. I do not know what you will think of the manner in which I was aſſured it was made; a potter had placed his veſſels in the oven to be baked, and behold one of them came out changed

changed into this head! you may believe it if you pleaſe; many believe it at Alcala! for my part, as I know no other circumſtances of this miracle, and have no other authority than that of my guide, with his tale about the fifteen thouſand dollars, I am rather ſuſpicious." *

Alcala is only ſix leagues from Madrid, and belongs to the Archbiſhop of Toledo; it gave birth to Miguel Cervantes de Saavedra, the celebrated author of the much admired romance of Don Quixote. § The country around is bleak, owing

 to

* Viage de Eſpana par Don Antonio Ponz, tom. 1, Madrid, 1776.

§ Miguel Servantes de Saavedra was born at Alcala de Henares the 9th of October 1547, and died at Madrid the 23d of April 1616. The ſame nominal day as his illuſtrious cotemporary Shakeſpeare.

There is ſuch a variety of matter and ſo many beautiful paſſages and alluſions in Don Quixote, that it is impoſſible to travel through Spain, without their frequently occurring to the mind. Don Guillermo Bowles has occaſionally quoted him, and I hope I may be allowed the ſame liberty. This book is one of thoſe capital pieces only underſtood by thoſe who can read him in the original. We may now ſoon expect a new and claſſical edition of Don Quixote printed in England in the original Spaniſh, illuſtrated by annotations and extracts from the hiſtorians, poets, and romances of Spain and Italy, and other writers ancient and modern, with

to the ſingular averſion which the Caſtilians have in general to the planting of trees. Nothing further occurs between this place and Madrid, the environs of which will be deſcribed on another occaſion.

LETTER III.

Natural hiſtory of the Grana Kermes, or ſcarlet grain.

AMONGST the various and valuable productions with which the beneficent hand of nature has enriched the dominions of Spain, the *Grana Kermes* is chiefly deſerving of attention. This valuable production had been conſiderably neglected in that kingdom ſince the importation of cochineal from America; however, the royal Junta de Comercio, or board of trade at Madrid, having an eye

with a gloſſary and indexes, by the Reverend John Bowle, M. A. F. S. A. London printed for B. White, 1777.

Beſides the advantage of having a more perfect and accurate text than has ever yet appeared, this is a work of ſuch magnitude as will reflect infinite honour on the erudition and taſte of the ingenious editor; how ſingular a pleaſure to the admirers of Cervantes in general! how great the ſurpriſe to the Spaniards! when they behold one of their favourite characters ſo nobly emblazoned by an Engliſhman.

eye to the further advantages to be drawn from this precious article, gave orders a few years ago to Don Juan Pablo Canals, director general of the madder and dyes of Spain, to report the ſtate of this product; and to him I am indebted for the preſent information on this ſubject. *

The grana kermes is the *coccos baphica* of the Greeks; the vermiculus, or coccum inſectorium of the Romans; and the kermes, alkermes, of the Arabs; being the ingredient with which the ancients uſed to dye their garments of that beautiful grain colour, called coccinus, coccineus, or cocceus, different from the purpura of the Phœnicians, which at firſt had been obtained from that teſtaceous fiſh, called the murex. † But in courſe of time the purple colour and other tints having

 been

* Memorias que de la real junta general de ſomercio y Moneda ſe dan al publico fobre la Grana Kermes de Eſpana. Pon Don Juan Pablo Canals y Marti. Madrid, 1768.

† Tyrioque ardebat murice lana. Virg. Æn. lib. 4.

Though the dye obtained from the murex was thought to have been loſt, it ſeems to be known on the coaſts of England, France, Spain, and the Weſt Indies, though neglected on account of the great trouble and expenſe. See Padre Feijoo Theat. critico, tom 6, diſc. 4. According to Gage, they find a ſhell fiſh in the ſeas of the Spaniſh Weſt Indies, which perfectly reſembles the ancient purpura, and

been more eaſily effected by means of the kermes, the murex was neglected on account of the expenſe, and the kermes we are now ſpeaking of, was introduced; which giving a ſtronger and brighter colour, was univerſally adopted, and ſupported its reputation for ages, till the diſcovery of America; as is evident from the many old tapeſtries, damaſks, and velvet hangings, ſtill preſerved in cathedrals, which ſeem yet to retain their primitive luſtre and brightneſs. †

In the reign of Lewis the fourteenth, Giles and John Gobelin, in the year 1667, under the patronage of Colbert, introduced the ſecret into France of dying woollen of that beautiful ſcarlet called after their name, which was done with the kermes that had been long in uſe in Flanders, where many old pieces of tapeſtry, though above two hundred years old, had ſcarcely loſt any thing of their bloom. But cochineal, being now introduced into the dyehouſe, ſo called from the latin word coccinella,

and in all probability is the ſame. Cloth of Segovia dyed with it, uſed to ſell for 20 crowns the ell, and none but the greateſt Spaniſh lords wore it. Don Antonio de Ulloa alſo gives a particular account of this fiſh, and the uſe made of it in America. See gentleman's magazine, for October and November, 1753.

† This was the colour called *carmeſi*, by the Spaniards; cramoiſi, by the French; and crimſon, by the Engliſh.

nella, as a diminutive of coccum, and giving that brightneſs to ſcarlet, at firſt called Dutch, and afterwards Paris ſcarlet, the invention of which, according to Kunkel, is owing to Kuſter, a German, by means of a ſolution of tin in aqua regia; the kermes then began to decline, and yield in its turn as the murex had done before, of which Colbert makes a particular complaint, in his general inſtructions to the dyers of France, in the year 1671. § Inſenſibly, the kermes was totally laid aſide, and cochineal made uſe of, not only in yarns, but alſo

§ As the Phœnicians neglected the ancient purple, and gave a preference to the ſcarlet, whoſe colour is leſs coſtly and more beautiful; juſt ſo, the French have forſaken our ſcarlet for that of the Dutch. This new-invented colour was at firſt in eſteem on account of its brightneſs; but being leſs durable than that of France, and under a notion that they were both equally liable to ſpots, they were ſoon laid aſide, which occaſioned the downfal of our moſt valuable cloth manufactures, where this colour was ſo much in uſe, particularly amongſt our nobility, that few were without a ſcarlet cloak of cloth, much preferable to thoſe of Barracan now in faſhion, which are of foreign manufacture, leſs becoming, and alſo dearer, if we conſider the ſhort time they laſt. Chap. 304. "Again, in the "next chapter:" Therefore, to reinſtate our cloth manufactory and vermilion dye, (the kermes) it ſhould be introduced amongſt the nobility and army as the nobleſt of colours, moſt ſuitable to their rank; beſides cloth being more ſerviceable, either of this, or any other colour, than thoſe ſlimſy Barracans, we import fro abroad. General inſtructions of Colbert, 1671.

alſo in ſilk; this new method being every where in faſhion, except at Venice, and in Perſia, for ſcarlet, and in other parts of the eaſt for crimſon.

The ancients thought the kermes was a gall-nut on account of its figure and ſize, not being larger than a juniper berry, round, ſmooth, gloſſy, and rather black, with a cinerous down. It is found ſticking to the branches, or tender leaves of the oak called in Spain *coſcoxa*, a derivative of the latin word cuſculium, the coccus ilicis of Linneus, likewiſe called *carraſca* in Spaniſh, from the Arabic word *yxquerlat*, ſoftened afterwards to *eſcarlata*; being the ſmalleſt ſpecies of oak, the ſame which Caſpar Bauhine and other Botaniſts call ilex aculeata cocci-glandifera. §

This

§ According to Pliny, the term cuſculium is derived from a Greek word, ſignifying to *cut the excreſcencies*, as it happens on this occaſion with reſpect to the kermes.

Cluſius ſays, Hiſpanis major frutex qui grandem fert *carraſca* dicitur, qui vero coccum gignit *coſcoxa*. Caroli Cluſii rariorum aliquot ſtirpium per Hiſpanias obſervatarum hiſtoria, Antuerpiæ, 1576.

It is ſtill called ſcarlet grain by the dyers, under the notion of being a grain of ſeed, though the very name in Arabic, ſignifies little worms.

Roderic, archbiſhop of Toledo, who finiſhed his hiſtory of Spain in 1243, ſeems to have coined the latin word *ſcarlatum*, to expreſs this colour. Tunc comes Petrus Aſſurii indutus ſcarlato et inſidens equo albo, &c. Rod. Toletani de rebus Hiſpanicis, lib. vii. cap. 1.

This tree, whoſe height is about two or three feet, grows in Spain, Provence, Languedoc, and along the Mediterranean coaſt; alſo in Galatia, Armenia, Syria, and Perſia, where it was firſt made uſe of. Dioſcorides ſays it grows plentifully in Armenia, and without particularizing other places, mentions what grows there to be better than that of Spain, which proves its high eſtimation in thoſe days; moreover confirmed by Pliny, who, ſpeaking of that which grew near Merida, adds, "Coccum Galaciæ rubens granum aut Circa Emeritam Luſitaniæ in maxima Laude eſt." Lib. 9. cap. 41. For which reaſon the Romans obliged the Spaniards, according to the ſame writer, to pay their tribute in this article. †

Joſeph Moya, a Catalan writer of the laſt century, publiſhed a treatiſe entitled *Ramillet de Tinturas*, dedicated to the city of Barcelona, under the feigned name of Pheſio Mayo. He ſays, the Kermes is common all over Spain, principally in that part of Aragon bordering on Catalonia, in Valencia, and in the biſhopric of Badajoz in Eſtremadura, as likewiſe in Setimbre of Portugal, where it is the beſt, and equal to the kermes of Galatia and Armenia. Mr. Hellot of the French academy of ſciences, in his Art of Dying, chap. 12. ſays it is found in the woods of Vauvert, Vendeman,

† Book 16. chap. 8.

deman, and Narbonne; but more abundantly in Spain, towards Alicant, and Valencia. It not only abounds in Valencia, but alſo in Murcia, Jaen, Cordova, Seville, Eſtremadura, la Mancha, Serranias de Cuenca, and other places.

In Xixona and Tierra de Relleu, there is a diſtrict, called De la Grana, where the people of Valencia firſt began to gather it, whoſe example was followed all over Spain. It has, ſome years, produced thirty thouſand dollars (£5000--) to the inhabitants of Xixona. In the Year 1758, there went out of that town, Relleu, Buſſot, Caſtilla, Ibi, Tibi, Unil, Santa faz, Muchiamel, and San Juan de la Huerta de Alicante, above a thouſand perſons to gather the kermes, which was afterwards ſent to Alicant, where it was put into caſks for exportation, being chiefly ſhipped for Genoa and Leghorn, paſſing from thence to Tunis. In the ſame year, 1758, they gathered about 300 arrobes of kermes at Xixona, which ſold for about twenty-four dollars (£4--) the arrobe, † with about ſix per cent. duty and ſhipping charges, till on board. In the kingdom of Seville it is put up to public ſale and is generally bought by the people of the neighbourhood, who ſell it again for exportation to the merchants of Cadiz.

Both

† An arrobe is 25lb: Spaniſh weight; 100lb. Spaniſh equal to 97lb. Engliſh.

Both ancients and moderns ſeem to have had very confuſed notions concerning the origin and nature of the kermes; ſome conſidering it as a fruit, without a juſt knowledge of the tree which produced it; others taking it for an excreſcence formed by the puncture of a particular fly, the ſame as the common gall obſerved upon oaks. Tournefort was of this number. Count Marſigli, and Dr. Niſole, a phyſician of Montpelier, made experiments and obſervations with a view of further diſcoveries, but did not perfectly ſucceed. Two other phyſicians at Aix, in Provence, Dr. Emeric and Dr. Garidel, applied themſelves about the ſame time, and with greater ſucceſs; having finally diſcovered that the kermes is in reality nothing elſe but the body of an inſect transformed into a grain, berry or huſk, according to the courſe of nature; whoſe hiſtory I ſhall now briefly relate:

The progreſs of this transformation muſt be conſidered at three different ſeaſons. In the firſt ſtage, at the beginning of March, an animalcule, no larger than a grain of millet, ſcarce able to crawl, is perceived ſticking to the branches of the tree, where it fixes itſelf, and ſoon becomes immoveable; at this period it grows the moſt, appears to ſwell and thrive with the ſuſtenance it draws in by degrees: This ſtate of reſt ſeems to have deceived the curious obſerver, it then reſembling

bling an excreſcence of the bark; during this period of its growth, it appears to be covered with a down, extending over its whole frame, like a net, and adhering to the bark: its figure is convex, not unlike a ſmall ſloe; in ſuch parts as are not quite hidden by this ſoft garment, many bright ſpecks are perceived of a gold colour, as well as ſtripes running acroſs the body from one ſpace to another.

At the ſecond ſtage in April, its growth is compleated, its ſhape is then round, and about the ſize of a pea: it has then acquired more ſtrength, and its down is changed into duſt, and ſeems to be nothing but a huſk, or a capſule, full of a reddiſh juice not unlike diſcoloured blood.

Its third ſtate is towards the end of May, a little ſooner or later, according to the warmth of the climate. The huſk appears replete with ſmall eggs, leſs than the ſeed of a poppy. Theſe are properly ranged under the belly of the inſect, progreſſively placed in the neſt of down, that covers its body, which it withdraws in proportion to the number of eggs: after this work is performed, it ſoon dies, though it ſtill adheres to its poſition, rendering a further ſervice to its progeny, and ſhielding them from the inclemency of the weather or the hoſtile attacks of an enemy. In a good ſeaſon they multiply exceedingly, having from 1800 to 2000 eggs,

2000 eggs, which produce the ſame number of animalcules. The ancients knew them to be inſects, for Pliny ſays, "Coccum ilicis celerrime in vermiculum ſe mutans." Lib. 24. ſect. 4. When obſerved with the microſcope in July or Auguſt, we find that what appeared as duſt, are ſo many eggs, or open capſules, as white as ſnow, out of each of which, iſſues a gold coloured animalcule, of the ſhape of a cock-roche, with two horns, ſix feet, and a forked tail.

Mr. De Reaumur has placed the kermes in the claſs of gall inſects, on account of the analogy in their mode of propagation, and immoveable form, continuing even after death, like the other ſpecies of this claſs, found upon different trees, appearing only like galls, or excreſcences, to the moſt accurate naturaliſts: Therefore they could not be more properly named, than gall inſects. There are of them of different ſhapes and ſizes, but that of the *coſcoxa* or *carraſca* (the kermes) is of a ſpherical figure, about the ſize of a juniper berry. It is found plentifully on the oldeſt and loweſt trees, and when the kermes are gathered near the ſea, they are larger and give a brighter colour than thoſe in any other places.

There are ſeveral ſpecies of galls diſcovered on different trees, and plants of Spain, though they only make uſe of thoſe gathered on oaks, either for

for dying, or any other purpoſes; ſuch are thoſe, from the Levant called Aleppo galls, which were generally made uſe of, till it was diſcovered by frequent experiments, that the new ingredient called dividivi was preferable, being a fruit from the province of Carracas, and Maracaybo, in South America.

The great myſtery which hitherto had not been diſcovered, by thoſe naturaliſts who knew how to diſtinguiſh the gall inſect, from the galls, was to veſtigate their mode of propagation: Mr. de Reaumur aſſures us, that from frequent obſervations it appeared to him, that there are both male and female, but that ſome which are extremely ſmall, transform themſelves into gnats, while others, growing larger, depoſit their eggs, without any transformation; from which, and their analogy with the others, he concluded, that the ſmall gnats with wings, though large in compariſon with their body, and ſtriped with a beautiful crimſon, were the males of the gall inſect, which he obſerved with the help of a microſcope, ſeeing how they fecundate the females, before they aſſume a globular form towards March; but this happens when it is ſcarcely ever noticed, and in ſo ſingular a manner, that a common obſerver would never imagine ſuch an event to have happened, or, even ſuppoſe, that the males which he ſaw friſking about, had the leaſt connection with the

the females; but on the contrary, were ſmall gnats which accidentally light upon the ſame boughs; if to this obſervation we add, that as the new kermes which come forth in June, remain ſmall without engaging our attention till March enſuing, when they begin to ſwell without any appearance of animal life, it will not be thought ſo extraordinary, that they have been generally held as a vegetable production. In Languedoc, and Provence, the poor are employed to gather the kermes, the women letting their nails grow for that purpoſe, in order to pick them off with greater facility.

The cuſtom of lopping off the boughs is very injudicious, as by this means they deſtroy the the next year's harveſt. Some women will gather two or three pounds a day, the great point being to know the places where they are moſt likely to be found in any quantity, and to gather them early with the morning dew, as the leaves are more pliable and tender at that time, than after they have been dried and parched by the rays of the ſun: ſtrong dews will occaſionally make them fall from the trees ſooner than uſual: when the proper ſeaſon paſſes, they fall off of themſelves, and become food for birds, particularly doves. Sometimes there will be a ſecond production, which is commonly of a leſs ſize with a fainter tinge. The firſt is generally found adhering

hering to the bark, as well as on the branches and ſtalks; the ſecond is principally on the leaves, as the worms chooſe that part where the nutritious juice preſerves itſelf the longeſt, is moſt abundant, and can be moſt eaſily devoured in the ſhort time that remains of their exiſtence, the bark being then drier and harder than the leaves.

Thoſe who buy the kermes to ſend to foreign parts, ſpread it on linnen, taking care to ſprinkle it with vinegar; to kill the worms that are within, which produces a red duſt which in Spain is ſeparated from the huſk. Then they let it dry, paſſing it through a ſearce, and make it up into bags. In the middle of each its proportion of red duſt put in a little leather bag alſo belongs to the buyer, and then it is ready for exportation, being always in demand on the African coaſt.

The people of Hinojos, Bonares, Villalba, and other parts of the kingdom of Seville, dry it on mats in the ſun, ſtirring it about, and ſeparating the red duſt, which is the fineſt part, and being mixed with vinegar, goes by the name of *Paſtel.* The ſame is done with the huſks; but theſe have but half the value of the duſt.

There is no doubt, but if this branch of induſtry was more cloſely attended to, there is yet room for improvement, and the kermes would give a brighter colour, ſimilar to that obtained from

from the cochineal, likewiſe an inſect found in the Mexican woods on a plant called nopal by the Americans, and *tuna* by the Spaniards; being the opuntia maxima folio obtuſo rotundo of Sir Hans Sloane, and the cactus opuntia Linneus.

It is remarked that thoſe plants which are cultivated by art, give a much finer cochineal, known by the name of meſtica, ſo called from the quantities collected of it in the diſtrict of Meteca, in province of Honduras. *

But neither the cochineal, the kermes, or any ſimilar production, would afford that beautiful colour, were it not for the ſalts employed in the lye by the dyers, to bring it to perfection. Mr. Maquer in his art of dying ſilks, aſſures us, that the white tartar employed for crimſon colours, gives by means of its acidity, that brilliancy to cochineal, and that though other acids might produce the ſame effect, it would not be with ſo much ſucceſs. Mr. Goguet, in his "origin of "laws, arts and ſciences," tells us, the ancients uſed a great deal of ſalt, to make their dyes ſolid, and permanent, ſupplying the place of our chemical preparations by other ſecrets unknown to us. Plutarch, in the life of Alexander the Great, mentions, that conqueror having found in the trea-

* See ſecond memoir of Mr. de Reaumur, tom 4.

treaſures of the king of Perſia, a prodigious quantity of purple ſtuffs, which though they had lain by above one hundred and ninety years, ſtill preſerved their luſtre, becauſe they had been prepared with honey; behold, ſays Mr. Goquet, a ſecret unknown to us! but if we reflect for a moment, that honey is a vegetable ſalt, like ſugar, we ſhall find it to be the ſame as tartar, which is no more than an eſſential ſalt of wine; ſo that the ſalts employed by the ancients, were equivalent to thoſe uſed at preſent in the dye-houſe. Probably the ſalts of fruits have the ſame effect in the manner they are uſed in Perſia for dying of ſilk, where, inſtead of tartar and honey, they uſe the pulp of red melons, well dried, mixed with allum, barilla, and other ſalts.

The kermes of Spain is preferred on the coaſt of Barbary, on account of its goodneſs. The people of Tunis mix it with that of Tetuan, for dying thoſe ſcarlet caps ſo much uſed in the Levant. The Tuniſians export every year above one hundred and fifty thouſand dozen of theſe caps, which yields to the Dey a revenue of one hundred and fifty thouſand hard dollars, (£33,750--) per annum for duties; ſo that, excluſive of the uſes and advantages of kermes in medicine, it appears to be a very valuable branch of commerce in Spain, and there is ſtill ſufficient encouragement to uſe every effort for its improvement.

LETTER

LETTER IV.

The method of making Saltpetre in Spain.

IN the year 1754, I received orders * from the miniſtry to inſpect into ſeveral ſaltpetre works, as well as into the making of gunpowder, which having complied with, the following reflections occurred to my mind.

All the profeſſors of chemiſtry I had converſed with, either in France or in Germany, laid down as a fixed principle, that there are three mineral acids in nature: that the vitriolic, is the univerſal one, belonging to metals, from whence the other two ariſe. That the nitrous is ſecond in activity, and belongs to the vegetable kingdom, and the marine being the weakeſt of all, is homogeneous to fiſh. They do not include the animal acid, which united with the phlogiſton, § forms the phoſphorus. I was further taught, that the fixed

* Don Guillermo Bowles.

§ By phlogiſton, chemiſts mean the moſt pure and ſimple inflammable principle, concerning which there are a great variety of opinions and doctrines, ſupported on the one hand, and controverted on the other with equal ingenuity, by chemical writers.

alkali of ſaltpetre, did not exiſt purely, and ſimply in nature, but was generated by fire, and when they found ſaltpetre, to be dug out of the earth naturally in the Eaſt Indies, they thought to ſave the difficulty, by ſaying it proceeded from the incineration of woods, which had impregnated the earth, with this fixed alkali, the baſis of ſaltpetre; ſo that I had been led to believe, it was formed by certain combinations, that took place in the act of combuſtion; but I ſoon found my error, when I had ſeen the method of making ſaltpetre in the different provinces of Spain. I have now evident proofs that the baſis of nitre really exiſts in the earth and in plants, the ſame as in the *Soda* of Alicant. Let theſe learned gentlemen come to Spain, they may convince themſelves of this truth, and ſee ſaltpetre with its alkaline baſis, in the manufactures of Caſtile, Aragon, Navarre, Valencia, Murcia, and Andaluſia, where it is made without the aſſiſtance of vegetable matter; ſometimes throwing in a handful of aſhes of matweed, merely to filter the lye of earth, and though they often meet with gypſeous ſtone in the neighbourhood of their works, yet they make excellent ſaltpetre by boiling the lixivium of their lands only, in which they do not find an atom of gypſum; conſequently they have gunpowder in Spain, without being indebted for its fixed alkali, to the vegetable kingdom,

and

and without the viſible or ſenſible converſion of the vitriolic acid of gypſum into the nitrous.

Having thus diſcovered in Spain a perfect fixed alkali in the earth, I purſued my obſervations on other ſalts, and vegetable productions, and after many reflections and experiments, I diſcovered that ſimilar fixed alkalies, many oils, and neutral ſalts, proceed from different combinations of the air, earth, and water, with ſuch matters as the air conveys in a diſſolved ſtate, and that theſe three elements, riſing, falling, and meeting, combine together, and form new bodies in the organs of vegetation.

Thoſe who are verſed in phyſics, agree, that all the ſubſtances of the very globe we inhabit, conſiſt of the combinations of fire, water, earth, and air; why then deny them the power of combining, in the living organs of plants? when we ſo often perceive in them, the faculty of changing, and transforming productions in the kingdom of nature. In proof of it, we find that many cruciformed plants give by analyſis, the ſame volatile alkali as animals, notwithſtanding that their tubes are ſimilar to the eye, with thoſe that give acids.

Some plants have their roots ſo ſmall, and yet their branches, leaves and fruit ſo ponderous, that it appears impoſſible, ſo inconſiderable a root

ſhould draw ſufficient nurture out of the earth for ſuch various purpoſes. It ſeems therefore, that the ambient air, containing many diſſolved bodies, penetrates into the plants, and combines in the vegetative tubes, forming thoſe ſubſtances diſcovered by analyſation.

I have frequently ſeen water melons in Spain weigh from twenty to thirty pounds, with a ſtem of only two or three ounces, ſo great was the increaſe of the fibrous and tubulous ſubſtance of thoſe plants, owing to the watery particles they imbibed from the air. It ſhould ſeem then, that many plants draw their principal ſupport from the air, water, and a ſmall portion of earth, combined by the imperceptible labour of the vegetative tubes, and veſſels of air, which convert thoſe matters into the products we contemplate, and taſte; many plants producing all theſe effects in water only, and we find that mint, and other odoriferous plants whoſe roots grow in water, and in the air, give the ſame ſpiritus rector, and oils, as thoſe that grow in the earth.

Botaniſts know very well that thoſe aquatic plants that ſpring up from the bottom of waters have a very trifling deviation, the ſame properties and qualities in the frozen regions, as in ſultry and parching climates, and, that their acrimony, cauſticity, inſipidity, and coolneſs, are invariable.

The

The experiments made by Van Helmont on the willow tree, making it grow in water, and a ſmall portion of dried earth, ſhew how much air, and water, added to the internal labour of plants, contribute to vegetation.

In the memoirs of the French academy of ſciences, we find experiments of a celebrated chemiſt, to prove the exiſtence of three neutral ſalts in the extract of borrage. If he had gone further, and proved that one of theſe three ſalts, exiſted in the earth, which produced the borrage, he would have illuſtrated the ſyſtem of phyſics, and cleared up the point I am ſpeaking of. The ſame memoirs mention another academician, who reared an oak for many years, only with water, the conſequences of which ſpeak for themſelves.

There are millions of firs about Valladolid, and Tortoſa, replete with turpentine, and growing in a ſmall portion of earth, and great quantity of ſand, in which it would be difficult to prove that the thouſandth part of the turpentine, ſo plentifully produced by theſe trees, had exiſted; of courſe, it muſt be owing to channels of air, connected with the tubes of vegetation.

The conductory veſſels of the wormwood of Granada, convey a bitterneſs to the very juice of the ſugar cane, which grows by its ſide: the ſoil of the

the king's botanic garden at Madrid, is of one equal kind, for all the different plants that are reared there, yet ſome produce a wholeſome fruit, while others near them, are poiſonous; and one, with fixed alkali, will thrive cloſe to another, full of volatile alkali. ‡

The mountains and vallies of Spain, as well as the gardens, are full of aromatic plants, yet I do not know that any body has ever extracted by analyſis, any aromatic water, or volatile oil, from any uncultivated land.

The variation of ſoil, or culture, may alter the form of plants, change the luſtre of their drapery, or give additional flavour to their fruit, but it can never change their eſſence, and nature. In proof of this, it is known, there is only one indigenous tulip in Europe, (I found it in flower near Almaden), it is ſmall, yellow, and ugly, appearing only in the ſpring. Gardeners may invent modes of cultivation, try all the climates of Europe, they may produce larger tulips with brighter colours, but they all will be inodorous, and the little tulip of Spain, will give by analyſis, the very ſame product

‡ Juſt as Shakeſpeare has emphatically ſaid:

The ſtrawberry grows underneath the nettle,
And wholeſome berries, thrive and ripen beſt
Neighboured by fruits of baſer quality. Hen. 5th.

duct as the moſt ſuperb of the eaſt, whoſe beautiful garment in common with other gay flowers, is owing to the phlogiſton in the organs of vegetation, and not to iron as has been thought. This phlogiſton is manifeſt by analyſis in the leaves, where the leaſt atom of iron has never been diſcovered.

There are many lands in Spain which naturally produce ſalt-petre, ſea-ſalt, and vitriolic ſalts; but the plants which grow ſpontaneouſly in thoſe ſoils, give by analyſis the ſame product as thoſe of their ſpecies in gardens, where there never was any appearance of ſalt-petre, ſea-ſalt, or vitriolic acid.

Analize as often as you pleaſe, thoſe plants ſo numerous near iron mines, whoſe roots penetrate into the very ore, or thoſe that grow in ferruginous and ſuperficial earth. I am ſure you will not collect from their roots, branches, aſhes, extracts, or oils, more iron, than what is found in the ſame ſpecies of plants that ſpring up in places without the leaſt communication with any ſuch minerals.

Whatever efficacy there may be in culture, and manure, to remove, abſorb, and open the pores of the earth, enriching the watery particles, that riſe in the vegetative tubes, conveying new ſubſtances which contribute to that perfection, we obſerve, from the ſoil, and which they loſe when tranſ-

planted,

planted, yet they ſtill attain various ſubſtances of vegetation from the air, which chemiſts may look for in vain in the earth. *

Many plants are emollient in the ſpring and ſummer, and aſtringent in autumn and winter. Their mucilaginous quality admits of alteration in the tubes, and the combination of earth, air, and water, engenders a vitriolic acid †, juſt as the alkali and the leaves receive colour from the phlogiſton; from whence I conceive the reaſon of the nitrous ſoil in Spain, abounding with ſuch a prodigious quantity of fixed natural alkali; which calls to my mind what is fondly advanced by the adepts, "That ſome lands have the natural properties of loadſtone to attract peculiar ſubſtances from the air."

It is certain then, that plants have proper tubes to attract the elements, and form a natural fixed alkali, and have peculiar ſeparate principles which only combine by the means of fire in the act of combuſtion

* The ingenious author of this reaſoning does not ſeem to be aware, that it would be equally fruitleſs to look for theſe ſubſtances in the water, or in the air. It is true that we cannot extract turpentine from the ſand, or from the earth, in which the fir trees of Vallidolid and Tortoſa grow; but it is equally true, that we cannot extract it either from the air, or from the water of thoſe countries.

† The exiſtence of vitriolic acid in vegetables has not yet been proved.

buſtion to form that artificial fixed alkali I had been taught to believe was the only one that exiſted in nature.

Perhaps the ſoda and ſalicornia may thrive better when nurtured by ſalt water, but it is no leſs certain that the alkaline baſis of common ſalt is found formed in theſe two plants, and in many others as well as in the barilla, which is ſowed in many parts of Spain, where they make as good ſoap as that famous ſort at Alicant made with ſoda and ſalicornia. With reſpect to neutral ſalts, there are at leaſt five ſubſtances, in which they are found, viz. earth, plants, ſalt water, mineral, and artificial ſubſtances.

After this digreſſion, let us now ſee how ſaltpetre is generally made in France and in Spain, I ſay nothing of England or Holland, becauſe they make none, importing what they want from the Eaſt Indies, where it is found naturally in the earth, as in Spain, where I have ſeen ſaltpetre made with the lixivium of nitrous earth, collected in places where perhaps there never was a tree nor a plant.

In Paris they have ſeventeen ſaltpetre works: every thing that is carried on there, as well as in other parts of the kingdom, is done according to royal ordinances, in the manner I am going to relate;

relate: The rubbiſh and filth of old houſes is carried to the works, and pounded with hammers; the duſt is then put into caſks, perforated at bottom, the aperture covered with ſtraw, to give a free paſſage to the liquor. Water is then poured on this duſt, which in its paſſage carries away all the ſaline matter. This impregnated matter is called a lye, which if they were at that period to boil, would produce ſaltpetre of a greaſy nature; to remedy this, they purchaſe the aſhes of all the wood fires in Paris, from which they alſo draw a lye that is mixed with the former, then boil up the whole.† In proportion as the water evaporates, the common ſalt which cryſtalizes when hot, ſoon falls to the bottom of the cauldron, and the ſaltpetre, which only cryſtalizes when cool, remains diſſolved in the water. They draw off this water, loaded with ſaltpetre, into other veſſels, and place it in the ſhade, where the nitre cryſtalizes. This is called ſaltpetre of the firſt boiling, having ſtill ſome remains of common ſalt, earth, and greaſy matter, incorporated with it; it is conveyed to the arſenal to be properly refined, being boiled over again, and left to

† The fact ſeems to be this; the ſalt they obtain from the lye of the rubbiſh, is a nitre with an earthly baſis, the fixed vegetable alkali procured from the wood aſhes is then added; this alkali precipitates the earth from the nitrous acid, and taking its place, forms true ſaltpetre.

to cryſtalize two or three times, or more if found neceſſary; by which means it is cleared of all its impurities, and becomes perfectly adapted to the making of gunpowder and the other uſes to which it is applied in the arts; but for medical purpoſes, it muſt undergo another purification. Thoſe who are curious of being more exactly informed, may find a very accurate account of theſe works in the memoirs of the academy of ſciences by Mr. Petit, to which I refer them.

In Spain, where a third part of all the lands, and the very duſt on the roads in the eaſtern and ſouthern parts of the kingdom, contain natural ſaltpetre, I have ſeen them prepare it in the following manner.

They plough the ground two or three times in winter, and ſpring, near the villages. In Auguſt they pile it up in heaps of twenty and thirty feet high: then fill with this earth a range of veſſels, of a conic ſhape, perforated at bottom, obſerving to cover the aperture with matweed and a few aſhes, two or three fingers deep, that the water may juſt filter through. They then pour on the water, (ſometimes without putting any aſhes); the lye that reſults from this operation is put into a boiler. The common ſalt, which as we ſaid before precipitates, and cryſtalizes when warm, falls to the bottom of the cauldron in a proportion of 40lb. to

40lb. to a quintal of materials; † then the liquor is poured into buckets placed in the ſhade, where it ſhoots, and cryſtalizes into ſaltpetre. The great quantity of common ſalt which accompanies the nitre, makes me think, that the marine acid with its baſis, is converted into nitre. The ſame earth, deprived of its nitrous quality by this proceſs, is again carried back to the fields, and expoſed to the elements, by which means, in the courſe of a twelvemonth, aſſiſted by the all-powerful and inviſible hand of nature, it again becomes impregnated with a freſh ſupply of nitre, and what is ſtill more ſurpriſing, and cannot be obſerved without admiring the wonderful works of the omnipotent creator, the ſame lands have produced time immemorial an equal quantity of ſaltpetre; ſo that if the ſupreme power was to annihilate all the factitious ſaltpetre of France, and Germany, Spain alone could ſupply the reſt of the world, without the aid of a fixed alkali, aſhes or vegetables, if public œconomy joined hands with induſtry, and aſſiſted in bringing theſe great points to perfection. I once aſked one of theſe people the reaſon of that conſtant production of ſaltpetre, but his only anſwer was, "I have "two fields, I ſow one with corn, and have a "crop,

† The Spaniſh quintal is 100lb. weight, and about 97lb. Engliſh. The arrobe of Madrid is 25lb. Spaniſh, and four arrobes make one quintal.

" crop, I plough the other, and it furniſhes me " ſaltpetre."

This ſaltpetre thus cryſtalized is ſimilar to that of Paris of the firſt boiling. In Spain they only boil it once more, and it becomes perfect, and proper for making of gun-powder, aqua fortis, and other purpoſes of the ſhops. Its baſis placed in a cellar, attracts the dampneſs of the air, loſes its activity, and forms a fixed alkali, which mixed with the vitriolic acid, forms a vitriolated tartar, a certain proof that the nitrous air of Spain is natural and perfect in itſelf, without the aſſiſtance of any fixed alkali whatever. †

I ſhall not dwell upon the proportion of ſaltpetre, ſulphur, and coal, uſed in the making of gunpowder; as it depends upon experience, and is generally known. I was preſent at the proofs made by the king's officers in Granada, to aſcertain whether the powder had the qualities required, in order to be admitted or refuſed, but I do not think

† However incredible this account of Mr. Bowles may appear to an Engliſh chemiſt, it would be rather raſh to deny the truth of it, particularly as he obſerves that the baſis of the nitre thus produced is a fixed alkali, and united with the vitriolic acid, forms vitriolated tartar. But if there is no deception in the caſe, the ſpontaneous production of the vegetable fixed alkali in a place where no vegetables grow, is a fact altogether new, and worthy of a further examination.

think thoſe proofs were to the purpoſe, as new made powder perhaps may throw a ball to the diſtance required; yet to form a true judgment of its real quality and goodneſs, it ſhould be tried in different places and climates, and at various ſeaſons of the year; for I am convinced that the gunpowder which would come up to the ſtrength required by the king in the dry and warm climate of Andaluſia, would be deficient in the damp and moiſt air of Galicia, which ſhews how little ſuch experiments are to be depended upon. Of all the inventions I know of for this purpoſe, the leaſt imperfect is that of Mr. Darcy, a deſign of which may be ſeen in the firſt volume of Mr. Beaume's tteatiſe on chemiſtry.

When the Count de Aranda was director of the engineers, I remember an old officer of artillery informed me that in the laſt wars in Italy, he had ſeen barrels of gunpowder, that were good in the morning, and bad the next night: This did not ſurprize me, knowing the variations of weather, and the effects of dampneſs piercing through the caſks and damaging the powder, ſo as to render it unfit for ſervice, for which reaſon every precaution ſhould be taken to guard againſt theſe inconveniencies. †

LETTER

† This is the ſubſtance of Mr. Bowles's diſcourſe. Some obſervations of his relating to the qualities of ſalts are

LETTER V.

Of the Merino ſheep.

THE wools of Spain form a conſiderable branch of our commerce with that country. It has even been ſaid that their fine quality was originally owing to a few Engliſh ſheep ſent into Spain, as a preſent by our Henry the ſecond, or according to others, by Edward the fourth, in 1465, but without entering into fruitleſs inveſtigations of an event ſo remote, and of ſo little conſequence, I ſhall confine myſelf to ſpeak of thoſe

are omitted, as thoſe ſubjects are treated of with greater exactneſs by modern chemiſts, to which the reader is referred.

It is likewiſe unneceſſary to expatiate upon, or point out the propereſt methods of preſerving gunpowder, ſo well known in this country, and with reſpect to the force of fired gunpowder, a late publication gives us the moſt curious and ample information, viz. "The force of fired gunpowder and the initial velocity of cannon ball, determined by experiments, from which is alſo deducted the relation of the initial velocity, to the weight of the ſhot and quantity of powder. By Charles Hutton, maſter of the military academy of Woolwich, which gained the prize medal of the Royal Society." Phil. tranſact. for 1778, vol. lxviii.

thoſe remarkable ſheep known in Spain by the name of *Ganado Merino*, "The Merino flocks," and deſcribe the conſtant method of conducting thoſe numerous tribes from the northern to the ſouthern provinces, to which they attribute that peculiar fine quality of the wool, which has rendered it ſo famous all over Europe. *

There are two ſorts of ſheep in Spain, ſome that have coarſe wool, and are never removed out of the province to which they belong, and others, that after ſpending the ſummer in the northern mountains, deſcend in the winter to the milder provinces of Eſtremadura, and Andaluſia, and are diſtributed into diſtricts, which go by the name of *Merindades*. Theſe are the Merino ſheep, of which it is computed there are between four and five million in the kingdom. † The word Merino,

* Though this account of Spaniſh ſheep appeared in the gentleman's magazine for 1764, and in other publications, yet as I am informed it came originally from Mr. Bowles, I have again inſerted the ſubſtance of his diſcourſe, in juſtice to its original author, with ſome further illuſtrations relating to the wool of Spain, not mentioned by that writer.

	Sheep.
† The duke of Infantado's ſtock about -	40.000
Counteſs Campo de Alenſe Negretti -	30.000
Paular, and Eſcurial convents, 30.000 each -	60.000
Convent of Guadalupe - -	30.000

Marquis

Merino, ſignifies a governor of a province. The Merino mayor is always a perſon of rank and appointed by the king. They have a ſeparate juriſdiction over the flocks in Eſtremadura, which is called The *Meſta*, and there the king in perſon is Merino mayor .§

Each flock conſiſts generally of ten thouſand ſheep, with a *Mayoral* or head ſhepherd, who muſt be an active man well verſed in the nature of paſture, as well as the diſeaſes incident to his flock.

Marquis Perales - - -	30.000
Duke of Bejar - - -	30.000
Several flocks of about 20.000 each -	200.000
All the other flocks in the kingdom together, on an average about - -	3.800.000
	4.220.000

In 1778, the wool of Infantado was 9285 arrobes in the greaſe, and Negretti nearly the ſame. Waſhed wool coarſe and fine together, worth at an average, eight and a half rials vellon per lb. (about 2s] excluſive of duties which are 20 per cent. on exportation.

There is a curious diſcourſe on the wools of Spain in the ſecond volume of the Spaniſh correſpondence of lord Sandwich, lord Sunderland, and ſir William Godolphin, in a book entitled, Hiſpania illuſtrata. London, 1702.

§ There is a ſupreme council at Madrid called *Conſejo de Meſta* which takes cognizance of all matters relating to ſheep, wool, ſhepherds, paſtures, woods, and all concerns that belong to royal ſeats and parks.

This perſon has under him fifty inferior ſhepherds, and as many dogs, five of each to a tribe. The principal ſhepherd has a hundred piſtoles (about £75.) and a horſe every year. The other ſervants have 150 rials for the firſt claſs (£1. 13*s*. 9*d*.) 100 rials for the ſecond claſs (£1. 2*s*. 6*d*.) 60 rials for the third claſs (13*s*. 6*d*.) and 40 rials, or nine ſhillings for the other attendants. Each of theſe has an allowance of two pounds of bread a day, with the ſame quantity of an inferior ſort for the dogs. They are likewiſe permitted to keep goats, and a few ſheep, of which they have the meat, and the lambs, provided the wool remains for the maſter. They may do what they pleaſe with the milk, of which they ſeldom make any advantage. In the months of April and October, each ſhepherd has 12 rials given him (about 2*s*. 9*d*.) as a perquiſite previous to his journey.

Though theſe flocks divide and ſeparate themſelves over ſeveral provinces of Spain, it will be unneceſſary to relate what paſſes in each, their government being ſimilar and uniform. The places where they are to be ſeen in the greateſt numbers are in the Montana and Molina de Aragon in the ſummer, and in the province of Eſtremadura in the winter. Molina is to the eaſtward of Eſtremadura, the Montana is to the north, and the moſt elevated

elevated part of Spain; Eſtremadura abounds with aromatic plants, but the Montana is entirely without them.

The firſt care of the ſhepherd in coming to the ſpot where they are to ſpend the ſummer, is to give to the ewes as much ſalt as they will eat; for this purpoſe they are provided with 25 quintals of ſalt for every thouſand head, which is conſumed in leſs than five months; but they eat none on their journey, or in winter. The method of giving it to them is as follows. The ſhepherd places fifty or ſixty flat ſtones about five ſteps diſtance from each other; he ſtrews ſalt upon each ſtone, then leads his flock ſlowly through the ſtones, and every ſheep eats at pleaſure. This is frequently repeated, obſerving not to let them feed on thoſe days in any ſpot where there is lime-ſtone. When they have eaten the ſalt, they are led to ſome argillaceous ſpots, where from the craving they have acquired, they devour every thing they meet with, and return again to the ſalt with redoubled ardour. *

* Mr. Bowles obſerves, that if the diſtrict is limy or marly, the ſheep eat leſs ſalt in proportion to the lime they find, and aſking the reaſon of one of the ſhepherds, was told, it proceeded from their grazing in cornfields, on which occaſion the illiterate ſhepherd ſeemed to relate the fact though ignorant of the cauſe, which was, according to Mr. Bowles,

At the end of July each ſhepherd diſtributes the rams amongſt the ewes, five or ſix rams being ſufficient for an hundred ewes. Theſe are taken out of flocks where they are kept apart, and after a proper time are again ſeparated from the ewes.

The rams give a greater quantity of wool, though not ſo fine as the ewes, for the fleeces of the rams will weigh twenty-five pounds, and it requires five fleeces of the ewes to give the like weight. The diſproportion in their age is known by their teeth, thoſe of the rams not falling before the eighth year, while the ewes, from their delicacy of frame or other cauſes, loſe theirs after five years.

About the middle of September they are marked, which is done by rubbing their loins with ocre diluted in water; ſome ſay this earth incorporates with the greaſe of the wool, and forms a kind of varniſh, which protects them from the inclemencies of the weather; others pretend that the preſſure of the ocre keeps the wool ſhort, and prevents it

Bowles, "from the ſalt all limy matter abounds with, and partaken of by cattle, either in licking the ſtones, or communicated by vegetation to graſs; for which reaſon, their appetite is not ſo keen for any ſalt that is offered them:" however we cannot admit this to be the true cauſe, as chemiſts are now well aſſured that lime does not contain any ſalt whatever.

it from becoming of an ordinary quality; others again imagine, that the ocre acts in the nature of an abſorbent, and ſucks up the exceſs of tranſpiration, which would render the wool ordinary and coarſe.

Towards the end of September theſe Merino flocks begin their march to a warmer climate; the whole of their route has been regulated by the laws and cuſtoms, time immemorial. They have a free paſſage through paſtures, and commons belonging to villages, but as they muſt go over ſuch cultivated lands as lie in their way, the inhabitants are obliged to leave them an opening ninety paces wide, through which theſe flocks are obliged to paſs rapidly, going ſometimes ſix or ſeven leagues a day, in order to reach open ſpots leſs inconvenient, where they may find good paſture, and enjoy ſome repoſe. In ſuch open places they ſeldom exceed two leagues a day, following the ſhepherd and grazing as they move on. Their whole journey from the Montana, to the interior parts of Eſtremadura, may be about one hundred and fifty leagues, which they perform in about forty days.

The firſt care of the ſhepherd is to lead them to the ſame paſture where they have been the winter before, and where the greateſt part of them were eaned; this is no difficult taſk, for if they were

were not led there, they will diſcover the ground, by the great ſenſibility of their olfactory organs, to be different from that which is contiguous; or were the ſhepherds ſo inclined, they would find it no eaſy matter to make them go further. The next buſineſs is to order the folds, which are made by fixing ſtakes, faſtened with ropes one to the other, to prevent their eſcape, and being devoured by the wolves, for which purpoſe the dogs are ſtationed without. The ſhepherds build themſelves huts with ſtakes and boughs, for the raiſing of which as well as for fuel, they are allowed to lop off a branch from every tree. This law is the cauſe of ſo many trees being rotten and hollow, which grow in thoſe places frequented by theſe flocks.

A little before the ewes arrive at their winter quarters, it is the time of their eaning, at which period the ſhepherds muſt be particularly careful. The barren ones are ſeparated from the others, and placed in a leſs advantageous ſpot, reſerving the beſt paſture for thoſe that are fruitful, removing them in proportion to their forwardneſs: the laſt lambs are put into the richeſt paſture, that they may improve the ſooner, and acquire ſufficient ſtrength to perform the journey, along with the early ones.

In

In March the ſhepherds have four different operations to perform with the lambs, that were eaned in the winter; the firſt is to cut off their tales, five fingers below the rump for cleanlineſs; the ſecond is to mark them on the noſe with a hot iron; next they ſaw off the tips of their horns, that they may not hurt one another in their frolics; finally they caſtrate ſuch lambs as are doomed for bell-wethers, to walk at the head of the tribe; which is not done by any inciſion, but merely by ſqueezing the ſcrotum with the hand, till the ſpermatic veſſels are twiſted like a rope, and decay without further danger.

In April the time comes for their return to the Montana, which the flock expreſſes with great eagerneſs, by various movements and reſtleſsneſs, for which reaſon the ſhepherds muſt be very watchful, leſt they make their eſcape, which often happens when proper care is not taken, and whole flocks have ſometimes ſtrayed two or three leagues while the ſhepherd was aſleep, as on theſe occaſions they generally take the ſtraighteſt road to the place which they came from.

The firſt of May they begin to ſhear, unleſs the weather is unfavourable; for the fleeces being piled one above the other, would ferment in caſe of dampneſs, and rot; to avoid which, the ſheep are kept in covered places to ſhear them more conveniently:

veniently; for this purpoſe they have buildings that will hold twenty thouſand at a time, which is the more neceſſary, as the ewes are ſo delicate, that if immediately after ſhearing they were expoſed to the chilling air of the night, they would certainly periſh.

One hundred and fifty men are employed to ſhear each thouſand ſheep. Each perſon is reckoned to ſhear eight ſheep a day, but if rams, only five, not merely on account of their bulk, and greater quantity of wool, but from their ficklenefs of temper, and difficulty to keep them quiet, the ram being ſo exaſperated, that he is ready to ſtrangle himſelf, when he finds he is tied; to avoid which, they endeavour by fair means and careſſes to keep him in temper, and with much ſoothing, and having ewes near him, they at laſt engage him to ſtand quiet, and voluntarily ſuffer them to proceed.

On the ſhearing days the ewes are ſhut up in a large court, and from thence conducted into a ſudatory, which is a narrow place, where they are kept as cloſe as poſſible, that they may perſpire freely, in order to ſoften the wool, and make it yield with more eaſe to the ſhears. This is particularly uſeful with reſpect to the rams, whoſe wool is more ſtubborn. The fleece is divided into three ſorts; the back, and belly, give the ſuperfine, the neck

neck and ſides give the fine, and the breaſts, ſhoulders and thighs, give the coarſe wool.

The ſheep are then brought into another place and marked, examining thoſe without teeth, which are deſtined for the ſlaughter-houſe; the healthy are led to graze, if the weather permits, if not, they are kept within doors, till by degrees they are accuſtomed to the air. When they are permitted to graze without being hurried, they ſelect and prefer the fineſt graſs, never touching the aromatic plants, though they find them in plenty, and if the wild thyme is entangled with the graſs they ſeparate it with great dexterity, avoiding it on every occaſion, moving eagerly to ſuch ſpots as they can find that are without it.

When the ſhepherd thinks there is a likelihood of rain, he makes proper ſignals to the dogs to collect the flock, and leads them towards ſhelter; on theſe occaſions the ſheep not having time to chooſe their paſture, pick up every thing they meet, thyme, roſemary, and every herb indiſcriminately, even poiſonous ones; ſuch as henbane, poppy, and hemlock, particularly ſoon after they are ſhear-ed. Were they to take a fancy and give a preference to aromatic plants, it would be a great misfortune to the owners of beehives, as they would deſtroy the food of the bees, and occaſion a diſappointment in the honey and wax. They are never ſuffered to move out of their folds till the beams

beams of the ſun have exhaled the night dews, nor do they let them drink out of brooks, or ſtanding waters, where hail has fallen, experience having taught them, that on ſuch occaſions they are in danger of loſing them all. The wool of Andaluſia is coarſe, becauſe their ſheep never change climate like the Merino flocks, whoſe wool would likewiſe degenerate, if they were kept at home; and that of Andaluſia would improve, were they accuſtomed to emigrate.

Between fifty and ſixty thouſand bags of waſhed wool are annually exported out of Spain. A bag generally weighs eight arrobes or 194 pounds Engliſh. About twenty thouſand bags of this wool are ſent annually to London and Briſtol worth from £30. to £35. each; ſo that we have one third of the produce, and of the beſt ſort. The wool of Paular, which is the largeſt, though not the beſt, is reſerved for the king of Spain's manufactures. The common and ſhooting dreſſes of the royal family of Spain and their attendants, are made of the cloth of Segovia, from whence our Engliſh nobility, in Henry the VIIth's time, were ſupplied with fine cloth. *

The crown of Spain receives annually, by all duties together on exported wool, near ſixty millions of reals vellon per annum. £675,000.)

LETTER

* Breadth of cloth made at Segovia, 1 3-4ths *vara*, or 57 3-4ths inches Engliſh.

LETTER VI.

Inconveniencies ariſing from the emigrations of the Merino ſheep, and the partial laws of the Meſta.

YOU deſire my opinion ‡ concerning the Meſta, but I have nothing to add to what I have frequently mentioned to you, on a ſubject not eaſily reduced into the compaſs of a letter; however I ſhall once more lay before you thoſe obſervations that have engaged me to entertain the notions I have formed to myſelf concerning the Meſta.

This appellation has corruptly crept into our language, and been applied to ſheep, when in reality it had no other ſignification, than a mixture of grain, and ſeed, ſuch as barley, beans, oats, lentils, &c. nor was any ſuch name as the Meſta flocks known in Spain before the days of king Alfonſo El

‡ This letter was written by the late ingenious Padre Sarmiento, to Don Antonio Ponz, and is dated Madrid, 12th Sept. 1765, and publiſhed by Ponz, in his eighth volume of Viage de Eſpana, Madrid, 1778. It ſhews how far the ſpirit of improvement has extended, and reached even within the gloomy walls of convents, and as it gives a lively idea of the ſpirit of the times, I thought it would perhaps be more acceptable to preſerve it in its original form.

El Ultimo, when Engliſh ſheep were firſt brought into Spain in the Spaniſh caracks. It was then that the office of judge of the Meſta had its riſe according to the Bachelor Fernan Gomez de Ciudad Real, in his 73d epiſtle. The aforeſaid king Alfonſo introduced theſe foreign valuable ſheep called Marinas, and not Merinas, according to the vulgar opinion; in the ſame manner as his preſent majeſty, Charles the third, has lately introduced at the Caſa del Campo,* ſome goats from Angora, ſo valued for their hair of a fine white, almoſt like ſilk, the breed of which might eaſily be propagated, as the diſtrict they come from, is in a parallel latitude with Spain.

A few years after this event relating to the Engliſh ſheep, our kingdom was deſolated by an univerſal peſtilence, which in 1348 ruined Spain and part of Aſia; and in 1350 carried off king Alfonſo. The dominions of Spain ſuffered infinitely on this diſmal occaſion, inſomuch that ſince the univerſal deluge, there is no inſtance of an equal calamity, for it waſted the country, and ſwept away two-thirds of the inhabitants. Spain became depopulated, and huſbandry ſeemed to be loſt. The many rural churches in the centre of the kingdom, are proofs of this terrible havock, that ruined whole villages, of which *Etiam periere ruinæ*. Thus four

* A royal ſeat near Madrid.

four or five villages, perhaps of two hundred families, were deſtroyed, and the country changed into a ſwamp or heath, open to any invader, and free to the firſt comer, who was willing to take poſſeſſion. The whole territory was afterwards claimed by the adjacent more fortunate villages, from whence we may account for the preſent amazing juriſdiction of ſome villages, which includes a ſpace of fourteen leagues in circumference; inſomuch that in places where before this fatal event, there were three or four populous pariſhes, there is now only one lonely pariſh thinly inhabited by people in diſtreſs; others were totally deſtroyed, nothing remaining but the ſteeples which are called rural churches.

Theſe churches, or at leaſt theſe ſteeples, ſeem ſtill to be crying out like Æacus in Ovid to Jove his ſire, on a ſimilar event, "*Aut mihi redde meos, aut me quoque conde Sepulchro.*" The doleful condition of theſe miſerable wretches will ſtrictly bear the compariſon. The peſtilence it is true laſted only a few years, but their miſery has continued above four centuries.

It is to this calamitous time we muſt attribute the origin of the Meſta. The Engliſh ſheep were firſt brought into the mountains of Segovia, without the leaſt idea of the Meſta or of Eſtremadura. It was the great ſpace of uncultivated land and the

the want of huſbandmen, that encouraged both ſhepherds and cattle to ſtray beyond their boundaries, and to wander into diſtricts where no impediments occurred to their progreſs, making a caſual uſe of the lands without the leaſt thought of proper cultivation, as that would require more hands than they were able to furniſh; and on this occaſion they firſt introduced that barbarous method of ploughing with mules, by which they only juſt ſcratched up the ground.

Thus what was ſo imperfectly tilled, and much more left entirely uncultivated, remained for the purpoſe of grazing for foreign cattle, to the great prejudice of agriculture. Eſtremadura is a province of Leon, and not of Caſtile; the natural remedy for theſe misfortunes was immediately perceived by the Portugueſe, though the Caſtilians would not underſtand it, ſome being warped by their avarice, under a fond notion of having large tracts of land although barren, and others by the flattering idea of poſſeſſing numerous flocks, as if agriculture had been loſt. The laws therefore that were made by Ferdinand King of Portugal deſerve to be written in letters of gold, one of which was; "That no perſon who was not an huſbandman or his ſervant, ſhould keep ſheep either for himſelf, or for others; and if any other perſons were deſirous of having them, they muſt oblige

oblige themſelves to cultivate a certain portion of land, under the penalty of loſing their cattle if the regulation was not exactly complied with." By this ſingular and moſt excellent law, many defects of the Meſta could be remedied, both in reſpect to the ſheep, and the ſhepherds, who without cultivating a foot of land uſurped ſo conſiderable a diſtrict, in a manner ſo prejudicial, to the induſtry of the farmer.

It is ſhameful to obſerve in Spain, a continuation of the barbarous cuſtoms of the Saracens, who totally neglectful of agriculture, wander with their cattle over the depopulated plains of Arabia and Lybia. When the induſtrious Moors poſſeſſed Eſtremadura, they turned the whole province into a garden, replete with inhabitants, as appears by the numerous armies they brought into the field againſt the Chriſtians. They did not ſend their flocks to Caſtile, nor the Spaniards come with theirs into Eſtremadura, for the Meſta was unknown.

This expreſſion therefore is not circumſcribed to the ſole mixture, or variety of cultivation, but comprehends grazing, united with farming, ſince the practice of both properly combined, conſtitutes the true farmer, who without ſome cattle, will ever be poor. The method obſerved by the Romans, in allotting a certain number of head of cattle

cattle of the larger and ſmaller ſort, in proportion to a given quantity of land, evinces the propriety of ſimilar laws in Portugal, as well as the indiſpenſable connection of theſe branches of rural œconomy.

Some perhaps will not believe, that the depopulation of Spain proceeds from the Meſta, as there are waſte provinces to be found where the Meſta is unknown. But I muſt anſwer them in general terms, that where there is no Meſta, every part is populous, as for inſtance, Galicia, Aſturias, the Montana, and Biſcay; to which may be added, Navarre, Catalonia, and Valencia. The Meſta not only depopulates Eſtremadura, but alſo the kingdoms of Leon, and Caſtile, where the ſheep deſtroy the country in their paſſage, preventing the farmers from incloſing their lands, according to their natural rights, as well as the civil and national laws, which permit thoſe incloſures where happily the Meſta does not prevail.

To return to the ſtate of population. The Roman empire, according to Riciolus, was ſuppoſed to contain four hundred and ten millions of people. In the days of Tertullian not a foot of land was uncultivated. Solinus ſays of Spain, "*nihil otioſum, nihil ſterile eſt.*" Eſtremadura contains two thouſand ſquare leagues of land. The moſt moderate calculation admits of a thouſand perſons to each

each ſquare league; then Eſtremadura would admit of two millions of inhabitants, which allowing four perſons to a family, would make five hundred thouſand families; but Uſtariz * only allows to Eſtremadura ſixty thouſand families; and the number is now thought to be leſs. Conſider then the diſproportion, and what prejudice the country receives from the Meſta. Galicia, where there is no Meſta, and only ſixteen hundred ſquare leagues, has above a million of inhabitants. So much concerning population, the life of a ſtate, when idleneſs is baniſhed, and induſtry encouraged. With reſpect to cattle, Galicia has more than Eſtremadura. Uſtariz ſays that about four millions of ſheep go into Eſtremadura: In Galicia they have not flocks of thirty and forty thouſand head, poſſeſſed by one perſon contributing nothing towards agriculture; he that has forty or fifty ſheep is a Crœſus, but the pooreſt of farmers have at leaſt five and twenty head of different kinds. Few reflect, that in a ſtate, a great many ſmall portions are of much more conſequence than a few large diviſions, though conſiſting of infinite numbers.

* Theoria y practica de commercio y marina, por Don Geronimo de Uſtariz, Madrid, 1742. This curious book has been tranſlated into Engliſh. See Uſtariz's theory and practice of commerce, by Kippax. London, 1751.

Othher advocates for the Meſta extol the value of the wool, and tell us it is an active commerce, but Uſtariz ſhews, that foreigners only pay us at par, for the wool in the fleece, and have a profit of four to one in vending their manufactures. The way to form an active commerce of our wool, and our ſilk, of wnich we have ſuch plenty, would be to work it ourſelves, and prohibit all foreign importations.

The culture of ſilk is of no prejudice to agriculture like the Meſta; a manufacture of ſilk would be of more advantage to Eſtremadura, than all the flocks of the Meſta together. Uſtariz computes the Meſta to employ forty thouſand people, deſtined by nature for agriculture; therefore, as each perſon could till land enough to produce 50 fanegas of corn, * would they not be better employed in raiſing two millions of fanegas of corn, either at home or in Eſtremadura, than in leading ſuch a wandering life in idleneſs and poverty? In Galicia they are not burthened with ſuch ſwarms of vagabond ſtrollers with their dogs, nor are they peſtered with wolves; one little girl while ſhe is ſpinning can overlook the domeſtic œconomy, and have an eye to the whole flock of the

* Fanega is a corn meaſure in Spain, five of which make an Engliſh quarter of eight buſhels.

the family, when the plains of Eſtremadura are ravaged and laid waſte by the locuſt. Aſk theſe partiſans of the Meſta, whether their ſheep ever go into battle, or render any public ſervice to their country? I know you have read the memorial of complaints made by the province of Eſtremadura againſt the Meſta; though they ſtill ſuffer this inconvenience in the interior parts of the kingdom, they ought to be more cautious on the frontiers towards Portugal, to prevent bad conſequences in caſe of a ſudden invaſion. I ſhould be glad to know how many head of cattle are maintained in Madrid, for I know their proviſion is not brought from the mountains, or paſtures, but from cultivated plains. Finally, I ſhall always be of opinion that except ſome ſpots reſerved for the royal chace, and the diverſion of our ſovereigns and their illuſtrious line, all the reſt ſhould be cultivated, as in the days of Tertullian, that each farmer ſhould incloſe his lands, and that the ſame ſhould be allotted to them for tillage, in proportion to their abilities, allowing a certain number of cattle, correſponding to the extent of the farm. Then, for the greater advancement of agriculture, the cultivators of land ſhould form a body politic, with power to enact wholeſome laws, and regulations, for the encouragement

and benefit of huſbandry. The Meſta people did ſo, and had a confirmation of their laws from Charles 5th, in 1544, but with this condition, of their not being prejudicial to a third perſon. Let Eſtremadura anſwer, whether this is the caſe? and let the farmers then give their opinions. But I muſt inſiſt with Solinus, that in Spain, no part where there is a poſſibility of avoiding it, ſhould remain *otioſum neque ſterile.* *

LETTER VII.

Miſcellaneous obſervations made at Madrid, with ſome account of the royal cabinet of Natural Hiſtory.

THE town of Madrid is now become the capital of the monarchs of Spain, ſituated in the center of their dominions, and from one of the filthieſt

* Ever ſince the acceſſion of the houſe of Bourbon to the throne of Spain, the extenſion of commerce, and the improvement of agriculture have been primary objects. The Real Junta de Commercio, or Board of Trade, was firſt erected by Philip the 5th, on the 15th of May, 1707. Many new regulations have been made for the benefit of commerce and agriculture, ſince his preſent majeſty's arrival from Naples at Madrid, which was on the 9th of December 1759. For the greater encouragement of agriculture

thieſt places imaginable, is at preſent on a par for cleanlineſs with ſeveral principal cities of Europe, being likewiſe well paved and lighted, but in reſpect to population, it is far inferior to London, Paris,

culture, all the old laws relative to corn were repealed in 1765, and the embarraſſments with which they were clogged totally removed: new laws more favourable to induſtry, were enacted, and a ſpirit of freedom and liberty introduced in the commerce of grain, in order to give every encouragement to the farmer. To improve the minds of the people, Academies were erected in Madrid, Valladolid, Seville, Valencia, and Barcelona, beſides many literary ſocieties in different parts of the kindom, particularly one at Madrid, with the nobleſt of titles "Los Amigos del pais," The Friends of their country, in which every ſubject is to be conſidered, tending to the advancement of arts, manufactures, and commerce; and the better to convey theſe ideas to the public, the art of printing has been particularly attended to, and brought to very great perfection: however as all theſe literary eſtabliſhments are ſtill in their infancy, time only will diſcover their intended effects. The new roads through the kingdom form a principal branch of modern improvement, and for the better compleating the ſame, they have been again put under the direction of the general poſt office, by a royal decree of the 8th October, 1778, with new revenues aſſigned for the purpoſe; but with reſpect to the want of inns, and conveniencies for travellers, Don Antonio Ponz, in his laſt volume inſiſts, that every thing that has, or can be ſaid, on the ſubject, is ſtill ſhort of the truth. "La verdad es, que en quanto a la penuria que ſe padece en eſta materia, qual-

Paris, or Naples. * Madrid is in a high ſituation, all the rivers and brooks in its neighbourhood fall into the Tagus, whoſe waters roll down to the ocean. The Guadarama mountains, to the north weſt of the town, are covered with ſnow ſeveral months of the year, which added to the piercing north winds, that reign in the winter, renders it exceſſively cold, while in ſummer the ſouthern and weſterly blaſts are generally attended with

qualquiera ſe quedara corto por mucho que diga." Viage de Eſpana, tom. 8. folio 212. Madrid 1778.

* The following table was publiſhed at Madrid for the year 1778, will ſhew the preſent ſtate of population in that town.

Pariſhes.	Marriages.	Births.	Deaths.
St. Mary	13	41	28
St. Martin	343	930	338
St. Gines	74	308	108
St. Lewis	107	239	79
St. Joſeph	114	212	121
St. Nicholas	7	12	15
St. Saviour	9	11	15
St. John	2	17	15
Holy Croſs	86	208	108
St. Peter	13	30	24
St. Andrew	108	341	109
St. Michael	18	87	50
St. Juſt	213	723	248
St. Sebaſtian	341	801	277
St. Iago	18	71	42
	1466	4031	1577

There

with dampneſs and rain. Travellers have told us, the air is ſo ſubtle that if a dead dog was thrown into the ſtreets over night, he would not have a bit of fleſh on his bones in the morning, but this is a fable, as it is a known fact, that dead dogs and cats lie in the ſtreets continually, as well as dead mules, cloſe to the road ſide, for days together, without any ſuch effect.

Hiſtorians relate that King John 2d being in Madrid, in 1434, it began to rain and ſnow on the 29th of October, and never ceaſed till the 7th January following, inſomuch that ſeveral houſes were deſtroyed, and the inhabitants reduced to the greateſt diſtreſs for want of proviſions; a report having been ſpread that the King intended to alienate the town, the inhabitants petitioned the King not to deſert them, which finally terminated in a royal edict of the 30th of May 1442, by which it was ordained that neither the town or its juriſdiction, could ever be alienated.

The

There died this year in the pariſhes and in the three hoſpitals 3483 perſons, without reckoning infants, and thoſe who died in communities, nnnneries, and the other hoſpitals of the court; and there have been 4372 births, including the foundlings baptized in St. Gines.

This year 611 infants have been brought to the royal foundation of *La Ineluſa* for foundlings, of which 341 have been baptiſed in the pariſh of St. Gines. Kalendario manual, y Guia de foraſteros en Madrid para el ano de 1778.

The principal ſtreets of Madrid are paved with cut flint, the others with pebbles, found in the neighbourhood, the cut flint on account of its ſharpneſs is very inconvenient to foot paſſengers, and the flat pavement near the houſes is too narrow. The town is well ſupplied with water, and there are conduits in the principal ſtreets; that called del berro, in the neighbourhood of the town is conſtantly drank by the royal family whereever they are. The bread is white and good, and when the barrenneſs of the country all around is conſidered, the *plaza mayor* or principal ſquare, where the market is kept, is extremely well ſupplied with all manner of proviſions.

Mr. Bowles has obſerved that if that celebrated profeſſor Mr. Henckel, had come to Madrid, he would ſoon have been convinced of his errror, in ſaying that " flint was not to be found in ſtrata and only in detached lumps, or in maſſes, for here he would find all the environs replete with ſtrata of flint; and moreover not a houſe or a building, but what has been conſtructed with lime made from flint, * which ſerves alſo for fire arms,

* It is allowed that nature by ſome proceſs unknown to us, ſeems to change limeſtone into flint, but this change once made, we cannot by calcination, or any other known means,

arms, as well as for the pavement. In ſome places pieces are found of it full of a ſpecies of agate, ſtreaked with red, blue, white, green, and black, that take a very good poliſh, but theſe colours are accidental, and diſappear by calcination. No acid will diſſolve it, or cauſe any efferveſcence; when calcined, it burns in the water with more violence than true limeſtone, and mixed with the pebble or coarſe ſand near Madrid, makes an excellent material for building, though it does not anſwer ſo well with the fine ſand of the river. It is impoſſible to fuſe this flint alone, or any other found in limy or argillaceous earths, no more than the different kinds of agates, cornelians and rock

means convert flint into lime: it is true that flint may be calcined, and then it loſes its flinty appearance, becomes white and may by a ſuperficial obſerver be miſtaken for lime, but it will not unite with an acid, it will not diſſolve in water, it will not make a cement; in ſhort it does not poſſeſs any of the diſtinguiſhing properties of lime. There are in this iſland beds of limeſtone ſtratified with layers of flint, and it is probably the caſe with theſe hills near Madrid; ſo that they get flint and limeſtone from the ſame quarry.

I am indebted to an ingenious friend ſince my return to England for this obſervation, and as I had not an opportunity of aſcertaining the point to ſatisfaction with reſpect to thoſe places near Madrid, I have related the circumſtance as ſtated by Mr. Bowles, with hopes that ſome future traveller in Spain may be inclined to examine that ground more minutely.

rock cryſtal, but they calcine by themſelves; that is, are turned into lime and fuſe very well mixed with fixed alkali of *Barilla*, or with lead, the eaſieſt to fuſe of all metals, and change into the Engliſh flint glaſs, which is by far the beſt hitherto known. Many naturaliſts, according to Mr. Bowles have followed this erroneous opinion reſpecting flint, and amongſt the reſt Mr. de Reaumur. Linneus in his Syſtema Naturæ, ſays, "*Silex naſcitur in montium cretaceorum rimis, uti quarzum in rimis Saxorum*," but we have only to open our eyes, to be fully convinced of the fallacy of this aſſertion, when we contemplate the numerous beds of flint near Madrid, and in different parts of Spain, and Italy, ſeparated from all cretaceous matter. The abate Fortis, in his late travels into Dalmatia, found the flint there, quite different from the deſcriptions of former naturaliſts, and adds, "I have often ſeen the flint in the very act as I may ſay of paſſing from the calcareous ſtate to the ſiliceous, and particularly I have often found flint envelloped in volcanic matter. I have formed a ſeries of theſe progreſſes, which I have ſhewn to ſome of my friends." *

In the environs of Madrid there are above two hundred villages, but few can be ſeen on account of

* Travels into Dalmatia by the abate Fortis, tranſlated into Engliſh. London, 1778.

of the inequality of the ground, the country being broken up by continual gullies, and various changes of aſpect, occaſioned by torrents, and other caſual accidents, in a country little cultivated, and abandoned to every viciſſitude of ſeaſon. Near the town they chiefly ſow barley, and here and there have ſome trifling vineyards. Their tillage is much the ſame as in Old Caſtile, that is, juſt to ſcratch up the earth and ſcatter the ſeed at random, then to cover it over with a ſimilar indifference, and wait for the coming of the poor labourers from Galicia, to get in their harveſt. The farmers pretend that if they were to make uſe of a ſtronger plough, they ſhould have leſs corn. Mr. Bowles next reproaches the Spaniards for paſſing over in ſilence their countryman Don Joſeph Lucadelo, a gentleman of Aragon, who had invented a curious plough much eſteemed by foreign nations, who had taken the merit of the invention to themſelves, ſuppreſſing the name of the ingenious Spaniard; but this perſon, whoſe name was Joſeph Lucatelli, was a native of Carinthia, one of the provinces of the houſe of Auſtria, who having made his experiments before the emperor Leopold in 1663, at the caſtle of Laxemberg, near Vienna, obtained a certificate of its utility from the imperial court, and then came to that of Madrid, and performed other experiments equally ſucceſsful at the Buen Retiro, in the preſence of

Philip

Philip the 4th, from whom he obtained an exclusive patent for the ſole vending of his plough for 24 reals plate in Europe, (about 11*s.*) and 32 reals plate (about 14*s.* 6*d.*) in America, of which a printed account was publiſhed by Lucatelli, at Seville, in 1664. A model of this plough was ſent by Lord Sandwich, then ambaſſador at Madrid, to John Evelyn, Eſq; who preſented it to the royal ſociety, with a letter deſcribing its uſe, which was inſerted in the philoſophical tranſactions of the 23d of February, 1669-70, and the model depoſited in Greſham college.

Nothing can be more bleak and diſmal than the general aſpect of the country round the ſeat of its monarch, with a great want of trees, to which the Caſtilians have ſuch a diſlike, from a falſe notion that they increaſe the number of birds to eat up their corn; as if this reaſon would not hold good in other countries, where ſhade is not ſo neceſſary, as it is in Caſtile, to ſupport the moiſture of the ſoil; or that it was ever an objection in Valencia, a kingdom ſo fertile and wooded: the Caſtilians not reflecting, that the ſeeds of plants, and leaves of trees, afford nurture for inſects, and birds, and prevent them from deſtroying the grain as they do in Caſtile, for want of other food; beſides the advantage of ſcreening the earth in hot weather, and preſerving a due moiſture

ture after dews and rain; for without their aid, the ſcorching beams of the ſun parch up the earth, and render it unfruitful; ſo that what little comes up is devoured by birds, in a climate where nature ſeems to have deſigned it ſhould be otherwiſe; for the climate of Madrid is not in itſelf averſe to the propagation of trees, as may be ſeen by the public walks, and modern improvements and plantations. The old hiſtorians ſpeak particularly of the woods, and of their advantageous ſituation for foreſt beaſts, as appears from a book written by king Alfonſo el ultimo, called *Libro de Monteria del Rey Don Alonſo*, in which that monarch extols the country near Madrid, for its ſhady ſituation and extenſive woods, well adapted for hunting the ſtag, wild boar, and even of bears. †

I ſhall

† Libro de Monteria por G. Argote de Molina 1582. This curious book was drawn up by the particular command of King Alfonſo; Argote de Molina being only the editor. It contains three books, and is very ſerviceable for the right underſtanding the geography of Caſtile, and Leon in thoſe days. Beſides particular directions for breaking of dogs, and training them properly, there is a circumſtantial detail of the various woods, and ſituations, proper for venary, and foreſt beaſts, underſtood under the title of *Monteria*, ſuch as the bear, ſtag, wolf, and wild boar, which ſport was the delight of Spaniſh princes, while they diſregarded the beaſts of the chace, ſuch as the buck, fox, marten, and hare. His preſent Catholic majeſty takes great pleaſure in ſhooting wolves and wild cats.

I ſhall not particularize the various improvements that have taken place of late years; however the new regulations and extenſion of commerce with their American colonies, are worthy of notice, particularly the open and free trade with each other granted in 1764, to the provinces of Peru, New Spain, Guatimala, and kingdom of Granada, in America. In order to render this plan more compleat and facilitate the intercourſe with Europe, eight packet boats for conveying letters were built at Coruna, one to ſail the firſt day of every month, with a mail for the Havana. Accordingly the firſt packet named the *Cortes*, ſailed for the Havana the 1ſt of November, 1764. Five packet boats were eſtabliſhed to ſail from the Havana to Vera Cruz, from whence a poſt road was made as far as Mexico, with its neceſſary branches, and communications, with the different provinces; ſo that letters come every month from thoſe diſtant places, and often ſooner, than from European courts. At Porto Rico, four galliots were eſtabliſhed for the correſpondence of Terra Firma, and Peru, receiving the letters brought by the Coruna packet boats, and bringing back the anſwers, by which means they receive letters from Carthagena, and Santa Fe, as quickly as by the Havana. Two galliots were likewiſe ſtationed at Carthagena, for the correſpondence between Porto Bello and Panama.

To

To extend this advantage further to the ſouthward, ſix packet boats were appointed in 1767, to ſail from Coruna to the river of Plate, and city of Buenos Ayres, from whence ſix expreſſes were to proceed annually with the letters for Peru and Chili, and other provinces of thoſe extenſive dominions; all which has been conducted with ſo much activity and ſpirit, that communications have been opened over the famous *Cordillera* of Chili, between that kingdom and Peru, and a regular poſt for letters kept up, in the moſt remote juriſdictions; where, before that period, even the very idea or name of a poſt-office was unknown. For the conducting of which, the general poſt-office have 25 veſſels; viz. 14 from the Coruna to the Havana, Montevideo and Buenos Ayres; 5 from the Havana, to Vera Cruz; 4 from Porto Rico to Carthagena; and 2 from Carthagena to Porto Bello.

The Royal Cabinet of natural hiſtory, at Madrid, was opened to the public by his majeſty's orders in 1775; a handſome houſe having been purchaſed, of which the firſt floor was appropriated for the royal academy of San Fernando, and the ſecond for the purpoſe of receiving an ample collection of natural curioſities, which had been collected in Paris by Don Pedro Davila * a native of Peru, which his majeſty has accepted of, and appointed,

* See catalogue des curioſités du cabinet de Davila. 3 tomes, avec figures. Paris, 1767.

pointed him director thereof; and was alſo at the charge of bringing them from Paris. Every thing is ranged with neatneſs and elegance, and the apartments are opened twice a week for the public, beſides being ſhewn privately to ſtrangers of rank.

The collection of beaſts and birds, at preſent is not large, but may be ſuppoſed to improve apace, if they take care to get the productions of their American colonies. They have the ſkeleton of an elephant that died lately at Madrid; alſo a little American ox ſtuffed, called Zebu, by Mr. de Buffon, and Zebulo by the Spaniards. The great Ant bear from Buenos Ayres, the Myrmcophaga Jubata of Linneus, called by the Spaniards *Oſa Palmera*, was alive at Madrid in 1776, and is now ſtuffed and preſerved in this cabinet. The people who brought it from Buenos Ayres, ſay, it differs from the ant-eater, which only feeds on emmets and other inſects; whereas this would eat fleſh, when cut in ſmall pieces, to the amount of four or five pounds. From the ſnout to the extremity of the tail this animal is two yards in length, and his height is about two feet. The head very narrow, the noſe long, and ſlender. The tongue is ſo ſingular, that it looks more like a worm, and extends above ſixteen inches. His body is covered with long hair, of a dark brown, with white ſtripes on the ſhoulders; and when he ſleeps he covers his body with his tail.

The

Osa Palmera. Myrmecophaga Jubata. Lynn.

The mineral part of the cabinet, containing precious ſtones, marbles, ores, &c. is very perfect. Amongſt other curioſities they have a grain of gold of 22 carats, which weighed ſixteen marks, four ounces, four ochavos, Spaniſh weight, found in California, and ſent by the viceroy of Mexico as a preſent worthy of his majeſty's acceptance; † alſo ſeveral curious ſpecimens of ſilver ore, from the Guadalcanal mine in Eſtremadura, of that ſort called *Roſicler*.

Specimens of Mexican and Peruvian utenſils, vaſes, &c. in earthenware of that kind, which the Spaniards call *Barra*, wretched both in taſte and execution. Some productions likewiſe of Otaheite, which the Spaniards call amath.

A curious collection of vaſes, baſons, ewers, cups, plates, and ornamental pieces of the fineſt agates, amethyſts, rock cryſtals, &c. mounted in gold, and enamel, ſet with cameos, intaglios, &c. in an elegant taſte, and the moſt delicate workmanſhip, ſaid to have been brought from France by Philip the fifth. There is likewiſe a valuable

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luable collection of books and prints daily adding to the cabinet by the ſaid Don Pedro Davila.

Were painting and ſculpture my objects, this would be the place to deſcribe the many fine pictures in the royal palace and in the noblemen's houſes at Madrid; but I paſs them over in ſilence the more readily, as modern travellers have deſcribed the moſt beautiful of theſe pictures. I ſhall juſt obſerve that a late writer who ſpent ſome time at Madrid, ſpeaking of the church of the viſitation, called *Las Saleſas*, where the late king Ferdinand and his queen are interred, tells us, that at the principal altar, there is a fine copy of Raphael's transfiguration; whereas it happens to be a good picture of the viſitation, in alluſion to the name of the church, and done by Fransiſco de Muro at Naples. It is true a moſt excellent copy of Raphael's transfiguration may be ſeen at another church belonging to the convent of St. Tereſa, placed there by the founder, the Prince de Aſtillana, who conſidered it as an original of Raphael, and valued it at ten thouſand piſtoles (about £7000). It is ſuppoſed to have been done by Julio Romano, the ableſt and favourite ſcholar of Raphael. The ſame writer ſpeaking of the pictures in the palace of Buen Retiro in the ſaloon, named *De los Reynos*, calls one picture "Santa Cruz ſuccouring Geneva;" whereas it is the ſurrender of Genoa to that officer, being placed amongſt

amongſt other hiſtorical pieces of the times, which are termed by him, "Scripture ſubjects of the old teſtament.

That beautiful equeſtrian ſtatue of Philip the 4th, by Tacca of Florence, which ſtands in a little flower garden of the Retiro, is worthy of the higheſt admiration. The attitude of the horſe is ſurpriſingly bold, with both his fore feet in the air; and was imitated from a picture of Velaſquez, ſent to Italy for that purpoſe. When ſeen by the Florentine artiſts, they all agreed it was impoſſible to execute it; however Tacca with the aſſiſtance of Galileo happily applied the principles of equilibrium, and ſucceeded beyond expectation. This unfortunate artiſt died ſoon after of grief from the treatment he received from the grand duke's miniſter, concerning this ſtatue, but his eldeſt ſon Ferdinand came to Madrid, and fixed the parts together, which were three in number, and placed the ſtatue properly. Six hundred and fifty ſix quintals of 128lb. of metal each, were employed in the caſting. Its height, including the pedeſtal, is 84 palmos (19 feet 9 inches Engliſh). † In an inventory of the effects of the Retiro, it was valued at forty thouſand piſtoles (£.28.000) an enormous ſum, and much more than it could ever have coſt. It was propoſed a

† A Spaniſh palmo eight inches and a quarter.

few years ago to remove this ſtatue to ſome more conſpicuous place, but it is ſaid to have been objected to, by the then prime miniſter Marquis de Grimaldi, alledging that they muſt not pay any attention to the houſe of Auſtria, but he would have no objection if the head of Philip could be changed, for that of Charles the third.

Tacca alſo finiſhed the equeſtrian ſtatue of Philip the third in the Caſa del Campo, left imperfect by John de Bologna, at his death, and was brought to Madrid in 1616, by Antonio Guidi, brother in law to Tacca, attended by Andrew Tacca, another brother of the ſculptor, who brought with him the gilt metal crucifix fixed on the altar of the Pantheon at the eſcurial. The mention of the Retiro has naturally led me into the agreeable gardens of that palace, and to the menagerie, where, amongſt other curioſities, they have a creſted falcon from the Carraccas. This curious bird, which is about the ſize of a turkey, raiſes his feathers on his head in the form of a creſt, and has a hooked bill; the lower mandible rather ſtraight; his back, wings, and throat are black, the belly white, the tail diſtinguiſhed by four cinereous, and parallel ſtripes, and is an undeſcript bird not taken notice of by Linneus.

LETTER

LETTER VIII.

Deſcription of the palace and gardens of Aranjuez.

THE royal ſeat of Aranjuez, ſeven leagues diſtant from Madrid, and to which a moſt noble road has lately been made, is delightfully ſituated at the conflux of the rivers Tagus and Jarama; which run through the gardens, and add new beauty to this charming ſpot, where art and nature ſeem to go hand in hand with the moſt pleaſing and rural ſimplicity. On one ſide, fine avenues of ſtately oaks and lofty elms, convey the trueſt ideas of magnificence, while they afford the moſt reviving ſhade; on the other, the ſudden tranſitions to lawns and winderneſs, the caſcades of water breaking through the thickets, the tuneful ſongs of numberleſs birds, ſheltered in theſe cool receſſes, the occaſional appearance and paſſage of the monarch, attended by the grandees of his kingdom; all theſe objects united, and concentered in one point, fill the imagination with pleaſing ideas, and impreſs the mind of a traveller with a thouſand agreeable ſenſations, particularly in the ſpring, when every thing is in high bloom and perfection, and engage him to look at Aranjuez as one of the moſt beautiful places in Europe.

The

The whole of theſe gardens may be thrown into three grand diviſions, diſtinguiſhed by the names of *La Huerta Valenciana*, † *Los Deleites*, and *El Cortijo*. In the Huerta Valenciana, agriculture and gardening are carried on in the ſame manner as in that fruitful province, and they plough with horſes. In the Cortijo they uſe oxen, as in Andaluſia; and in other places they ſcratch up the ground with mules as is ſtill practiſed in ſome parts of Spain. Which ever way one looks round, a conſtant variety pleaſes the eye and enraptures the mind. At one moment the ſturdy buffalo moves before you, drawing his heavy burthen; ſoon after, the ſlow camel with his ponderous load; while the ſwift Zebra with his ſtriped garment friſks over the plains. If you approach the farm, every object of convenience is conſulted, and in the dairy every degree of neatneſs. The Dutch cow enjoys a luxuriant paſture, the brood mares greatly enliven the landſcape, and the ſtables are filled with the moſt excellent horſes. An immenſe nurſery furniſhes all manner of trees and plants, a cedar of Libanus, which about twenty years ago was only a twig, is now thirty feet

† By the term of Huerta is underſtood that kind of incloſure we call an orchard, but with a greater variety of cultivation. When they ſpeak of an ornamented flower garden near a palace or nobleman's houſe, the Spaniſh term is *jardin*, the ſame as in French.

feet high: the garden called the *Iſla* is particularly beautiful and rural. The Judas tree, which the Spaniards call *Arbol de Amor*, being happily diſperſed there, has a very good effect early in the ſpring, when covered with flowers without a ſingle leaf; the banks of the Iſla are further enlivened by elegant yachts, for the amuſement of the royal family. The fine avenue which alſo ſerves for a public walk, called *Calle de la Reyna* has nothing equal to it at Verſailles. The extenſive flower garden on one ſide, renders the walk extremely pleaſant in an evening; and were I to mention the quantities of flowers and fruit, it would require many details. A great many elms and oaks have been planted this year, (1778) ſaid to be 101.000, which muſt likewiſe include vines, olives, ſhrubs, &c. They have lately begun to cultivate pine apples, unknown in every other part of the kingdom.

At the noon-tide hour, when the freſhneſs of the morning is paſt, the ſhady walks near the palace then become an object of ſingular luxury, as well as the elegant fountains, whoſe ſportive waters give ſuch a coolneſs to the air. Whoever has enjoyed the agreeable moments that paſs in pleaſing converſe under theſe ſhady bowers, will ſurely be charmed with their admirable effect, independent of every idea of modern improvements, or criticiſm upon fountains and water works.

works. The nightingale and cuckow are heard here the latter end of April. That elegant bird the bee eater, called by the Spaniards *Abejaruxo*, the merops apiaſter of Linnæus, which our travellers tell us comes no further South than Andaluſia, is known not only to breed at Aranjuez and live there all the year round, but is alſo found at St. Ildefonſo, which is 20 leagues more to the northward. The golden thruſh is alſo ſeen here, a beautiful bird with a bright yellow plumage, the icterus of Edwards, called *oropendulo* by the Spaniards, and *l'auriot* by the French, the oriolus of Cateſby and Linnæus. Amidſt the great variety of birds in theſe woods, there is one about the ſize of a cuckow, called *Pito*, of a beautiful purple. Such a diverſity of objects could not fail to excite the genius and fire of the Spaniſh writers; for my part I willingly join with that elegant poet Don Gomez de Zapia, who has ſo naturally deſcribed them, in a poem, of which the following lines are the beginning:

En lo mejor de la felice Eſpana
Do el Rio Tajo tertia ſu corrida,
Y con ſus criſtalinas aguas bana
La tierra, entre las tierras eſcojida,
Eſta una Vega de belleza eſtrana!
Toda de verde yerba entretejida,
Donde natura y arte en competencia,
Lo ultimo puſieron de potencia. §

The

§ Parnaſſo Eſpanol, Tom. 3. Madrid 1773.

The Palace being an old building with ſeveral additions is more in the ſtyle of a hunting ſeat, as Philip the ſecond deſigned it, than of a royal manſion, nor is there any thing very particular in the apartments, to take off from the enjoyment of ſo many fine objects abroad. The new wings to the Palace are finiſhed; in one is a play houſe, and in the other a chapel. Part of the cieling of the former was painted by Mengs, who is now (1779) at Rome painting a holy family for the principal altar in the chapel.

There are ſeven fine pictures of Luca Jordano in the apartment called *El Cabinete Antiguo*, and ſix others in that *de los Mayordomos*; particularly one, is univerſally admired, in which a number of beaſts are repreſented liſtening to Orpheus, and ſeeming to be ſtruck with the melody of his lyre. The portraits of the grand Duke and Dutcheſs of Tuſcany by Mengs, are in a new apartment called the king's dreſſing room. In the chapel, over the great altar there is a fine picture of the Annunciation by Titian, preſented by him to Charles the fifth, and brought from the convent of Juſte after the death of that Emperor. The Porcelain Cabinet where there are ſeveral large pieces of the king's own Manufactory, is alſo an object of curioſity to a traveller. In a word, this charming place is highly indebted to Charles the third for bringing

bringing the whole to its preſent ſtate of beauty, and making the new road from Madrid, and the noble ſtone bridge over the Jarama: if the deſign is continued of planting trees on each ſide of the road, it will add greatly to its magnificence.

A topographical plan of Aranjuez and the improvements there, has been executed by Don Domingo de Aguirre, captain of engineers, in ſixteen ſheets, and the views in eight more. In ſhort, theſe rural places have ſo many charms, that they cannot fail of pleaſing every fancy, and meeting univerſal acceptation, as Lupercio Leonardo de Argenſola has happily expreſſed it, in a little poem in praiſe of theſe gardens.

Qualquiera aqui ſu condicion aplica,
Aunque ſu origen trayga de otra parte,
Do el ſol menos, o mas ſe communica!

But this is only to be underſtood with reſpect to the proper ſeaſon of the year, ſuited to its ſituation, for as it lies in a bottom ſurrounded with mountains, the air is of courſe confined, which added to the great quantity of water, and numerous plantations, makes it agueiſh when the hot weather begins, for which reaſon the court generally removes about the end of May, and goes ſoon after to St. Ildefonſo, which is a very high ſituation among the mountains of Guadarrama, where they

they begin a new ſpring and breathe a clear refreſhing air during the ſcorching heats of ſummer.

Great quantities of liquorice grow wild near the road between Aranjuez and Toledo, as well as on the banks of the Tagus, where one alſo finds ſome curious reeds made uſe of by the Romans for writing, and celebrated by Martial, in an epigram addreſſed to Macer, who had been pretor in Spain.

> Nos Celtas, Macer, et truces Iberos,
> Cum deſiderio tui petemus,
> Sed quocumque tamen feretur, illic
> Piſcoſi Calamo Tagi, notata
> Macrum, pagina noſtra nominabit, Lib. x.

The caſtle of Aceca dependent on the juriſdiction of Aranjuez though kept in good order, is more taken notice of on account of its former reputation, and antiquity, than from any other circumſtance. Its diſtrict is ſuppoſed to have belonged formerly to a colony of Jews from Toledo, and ſo named from *azeba* in Paleſtine peopled by Joſhua. † There is no doubt that the Jews were in great repute in Spain in the early ages, inſomuch that in 686, under the gothic king Ervigius, they had the boldneſs to aſſert, and endeavoured to perſuade the king, that the Meſſiah was not come. Their deſcendants ſeveral years afterwards propagated

† Kings. Book 1. chap. 17.

gated fables, to prove their great antiquity in Spain, and in order to leſſen the reproaches thrown on them by the Spaniards, they gave out, that they were not deſcended from thoſe Jews who crucified our Saviour.*

LETTER

* Sandoval, biſhop of Pamplona, relates, that when king Alfonſo conquered the city of Toledo, he found it full of Jews, who ſhewed to that monarch two letters in Hebrew and Arabic, ſent from the ſynagogue of Jeruſalem to that of Toledo, giving them an account of Jeſus Chriſt, and aſking their opinion whether they ſhould put him to death; alſo the anſwer of the Toledo Jews, diſſuading them from it. Theſe letters were ordered to be tranſlated from Hebrew into Arabic by Galifre king of Toledo, and into Latin and Spaniſh by king Alfonſo, and were preſerved in the archives of Toledo till 1494. They were tranſlated by Julian, archprieſt of St. Juſt, and were afterwards in ſeveral hands. The anſwer of the Spaniſh Jews is dated Toledo 14th of the month Niſan, æra of Chriſt 18, and of Auguſtus Octavianus 71. I know nothing further concerning the authenticity of this letter, ſays the biſhop of Pamplona, than that it was found in the archives of Toledo, and in the ſame ſtyle and language in which I have given it. Hiſtoria de los Reyes de Caſtilla y Leon por Don fr. Prudencio de Sandoval obiſpo de Pamplona. En Pamplona 1615.

LETTER IX.

Deſcription of the baths and mineral waters of Trillo.

NO country abounds ſo much as Spain with hot baths and moſt excellent mineral waters, and they are now beginning to inveſtigate their qualities. Thoſe of Trillo have of late particularly engaged the attention of government, and we have been more accurately informed of their virtues and properties. The village of Trillo, in New Caſtile, is ſeventeen leagues from Madrid, by the new road lately made to that place, ſituated on the north banks of the Tagus, two leagues ſouth of the city of Siguenza. The village of La Puerta is about a league to the eaſtward, and the town of Gualda much about the ſame diſtance to the weſtward. The country is hilly, and affords little corn or fruit, ſome few vineyards, and plenty of game. The Tagus abounds in fiſh, ſuch as trout, eels, and barbel; has a ſtone bridge of one arch over it, of a ſolid ſtructure, and conſiderable antiquity, being there when the firſt inveſtigations were made about this place in 1558. † A little

† Particular mention is made of Trillo by Ambroſio Morales. Antiquedades de las Ciudades de Eſpana. Alcala de Henares, 1575.

A little river runs from Cifuentes, which enters the Tagus at Trillo, and was once famous for its curious water mills, for ſawing of timber brought down by the ſtream, which was the chief branch of induſtry of the inhabitants; but in the year 1710, on the 30th of December, they were viſited by 1400 of the Engliſh army then ſerving in Spain, in favour of the archduke of Auſtria, who having ſtaid there ſeven days, raiſed conſiderable contributions, and were ſucceeded by 8000 Portugueſe their allies, under the Count de Atalaya, who ravaged the country, and pillaged the place: of the three ſaw mills, only one was left ſtanding, which has ſince become uſeleſs. The inhabitants dwindled in numbers, and the few that remained, from a ſtate of affluence and eaſe, experienced the extremity of poverty and diſtreſs; though in a ſituation, where the climate is remarkably temperate, the air pure, proviſions plentiful, their mutton ſingularly excellent, and a fine ſpring of ſoft water runs near the village.

The baths are up the river on the oppoſite ſide of the Tagus, about the diſtance of a mile, with an agreeable road to them, made from the foot of the bridge, with an avenue of trees, through a pleaſant diſtrict, well ſhaded with wood, where the warbling of nightingales, and the muſical notes of various other ſong birds, delight the invalid, and welcome his approach to theſe ſalutary baths.

baths. Inns are now building for the reception of company, and every effort is made for the convenience of the infirm. The waters have been analyzed with exactneſs, a deputation having been appointed by command of the king, to conduct every thing with the utmoſt formality, under the direction of Don Miguel Maria de Nava, Dean of the council and chamber of Caſtile, aſſiſted by Dr. Caſimir Ortega, F. R. S. and royal profeſſor of Botany at Madrid, who has publiſhed the proceedings of this aſſembly held at Trillo; and from his elegant treatiſe I have ſelected the following information. *

Theſe baths are ſituated at a ſmall diſtance from the banks of the river, in a meadow, at the brow of a hill, which by its ſituation to the eaſtward, affords a refreſhing ſhade the greater part of the morning. The baths are divided in the following manner.

Los

* Tratado de las Aguas Termales de Trillo eſcrito de orden del Rey por el Dr. Caſimiro Ortega, Madrid, 1778. The ingenious and learned Dr. Ortega was in England a few years ago, and is well known to ſeveral gentlemen in this country. Beſides the waters of Trillo, thoſe of Ribas, at a ſmall diſtance from the mountain of Nueſtra Senora de Nuria, near the Pyrenees of Cataluna, are greatly reſorted to in the ſpring, and autumn, for gravelly complaints, as is alſo the fountain of Paterna, in the Alpujarra mountains of Granada, called "*Aguas agrias*," "Acidulous waters."

Los Quatro Banos, called the king's bath, divided into four ſeparate baths, all equally commodious, and handſome, with their proper appertenances.

The Counteſs's Bath, ſo named after the lady of the Count de Cifuentes, who is lord of the place, is cloſe to the river, but judiciouſly built and remarkably ſolid, to reſiſt every impulſe of the ſtream, and equally decorated with every convenience and advantage.

The bath of the *Piſcina* is about four hundred paces from the king's bath, and has acquired this appellation from being chiefly made uſe of, by the poor, who are moſt ſubject to cutaneous complaints, for which purpoſe this bath is remarkably efficacious. A dwelling-houſe is now building for the uſe of the bathers, with every diſtribution of apartments and convenience, requiſite for a place of this nature: alſo, for a greater embelliſhment of the baths, they have planted round them that beautiful and odoriferous tree ſent thither from the royal botanic garden at Madrid, by the name of robinia pſeudo acacia. In Spaniſh *falſo aromo.* (The falſe acacia.)

Dr. Ortega, after referring us to Macquer, and other eminent chemiſts, who all agree, that the analyſis of waters, is the moſt difficult operation of chemiſtry, as it tends to diſcover that union, which

which nature by ſlow and ſecret ſteps, forms in water, and other ſubſtances, in its moſt occult and abſtruſe motions; proceeds to his analyſis of the waters of Trillo, after ſome ſtrictures and criticiſms on the writings of Dr. Limon Montero, on the mineral waters of Spain, publiſhed at the cloſe of the laſt century, intitled "Eſpejo Criſtalino de todas las Aguas Minerales de Eſpana." And after denying them any nitrous, aluminous, or ſulphureous qualities, as aſſerted by Dr. Limon, he cloſes his analyſis with the following corollary:

"That theſe waters participate of five ſubſtances, two volatile, and three fixed; viz. a phlogiſtic vapour, extremely anodyne, penetrating, and friendly to the nervous ſyſtem; of a moderate quantity of gas, calcareous earth, common ſalt, and ſelenetic ſalt; and that to each pound of water of ſixteen ounces, one may calculate twenty-five grains and an half, of fixed principle. This computation was made on a conſiderable evaporation of water, of about a quintal,† which was judged to be the beſt method, as leſs liable to error, than thoſe experiments with ſmall quantities. It was alſo conſidered, that of the twenty-five grains and an half, of fixed principle, correſponding to each pound of mineral water, near fourteen grains are common ſalt, about three of

† A Spaniſh quintal 97 pound Engliſh.

ſelenetic ſalt, and about eight and an half, of abſorbent earth; which for greater exactneſs we ſhall expreſs in this manner:

13 $\frac{327}{1000}$ grains common ſalt.
2 $\frac{285}{1000}$ grains ſelenetic ſalt.
8 $\frac{327}{1000}$ grains abſorbent earth.

The ſame proportions, with a very trifling deviation, were alſo found by Don Manuel Joachim Enriquez de Paiva, royal demonſtrator of the chemical laboratory at Coimbra in Portugal.

Dr. Ortega obſerves, that the lightneſs of this water is ſo great, as even to enter into competition with that of diſtilled water, the pureſt we know of; therefore its effects will be the more eaſily accounted for: that the heat of the water, does not equal that of the blood, in a perſon in good health, and comes near to that tepid degree, preſcribed by the phyſicians in artificial baths.

The bath of the princeſs is the moſt efficacious, or at leaſt abounds moſt with phlogiſton, and of courſe is better ſuited to thoſe diſorders where the efficacy of this principle is deſired. The king's bath, and that of the counteſs have ſcarcely any phlogiſtic vapour, which variety makes them ſtill more pleaſing to the bathers, and applicable to different complaints; while the Piſcina bath abounds chiefly with phlogiſton, and is admirably ſuited to the diſorders of the poor, as already obſerved:

ſerved: finally the two principles of gas, and of phlogiſton, are of ſo volatile a nature in theſe waters, that a remarkable difference is obſerved betwixt the well, and the bath, by thoſe who drink them immediately from the ſpring, or at a diſtance; which ſhews how much it evaporates by carriage; for which reaſon it ſhould not be filled in earthen pitchers, but only in bottles or flaſks, well corked, and carefully ſealed. This is the ſubſtance of a public oration pronounced by Dr. Ortega, before a numerous aſſembly at Trillo, and afterwards publiſhed by authority of the council at Caſtile, in virtue of their decree for that purpoſe, bearing date the 11th of April 1778, to which are added a few trifling caſes, with that of the dean of the council, Don Miguel Maria de Nava, at the head of them, who found great benefit from theſe waters, and preſided at this pompous aſſembly, attended by the Count de Cifuentes, a grandee of Spain, and many other noblemen and gentlemen of rank, as well as ſeveral eminent phyſicians, ſurgeons, and apothecaries, who all concur in the praiſes of Trillo, and ſet their names to the facts there related.

I ſhall only ſelect one caſe, inſerted by Dr. Ortega, and taken by him verbatim from Dr. Mendoza, phyſician at Cifuentes, written at Trillo ſo early as the 18th of July, 1714, adorned with a

copper-plate, repreſenting the virgin Mary as protectreſs of the waters, being one of the firſt cures, which brought them into repute.

" A friar of the congregation of St. Philip De " Neri, was troubled with ulcers in his legs, the " remains of a malignant eryſipelas, and an ab- " ſceſs in the bone of the right clavicle, which " having been opened by the perſon who attended " him, terminated after a long and painful proceſs, " in a fiſtula. An ill-conditioned abſceſs of a great " ſize, was diſcovered at the ſame time, ſituated " on the laſt right rib, which was deemed very " dangerous to open. He had alſo a tumour " ſeated in the right axilla, another on the left " hand, and others on the ſhoulders, a pain in the " ſide, a hectic fever, ſhortneſs of breath, painful " reſpiration, and a ſallow complexion, with con- " ſtant faintings and vapours, which flew to the " head, and often occaſioned a ſyncope. Having " ſuffered thus, for two years, and all the remedies " having failed, which are called human, he came " to Trillo, drank the waters, uſed the baths, and " voided a great deal of ſand. The ulcers being " healed, though for ſome time the hectic did not " ſubſide, he returned the following ſeaſon to re- " peat the uſe of the waters and baths; and was " perfectly cured, ſo as to go [illegible]e without a " fiſtula, tumours, or pain in the ſide; his reſpi- " ration recovered, with a healthy and florid com- " plexion;

" plexion; and finally with ſo much natural vi-
" gour, that even the iſſues which he had been ad-
" viſed to have made, could not be kept open,
" notwithſtanding every endeavour for that pur-
" poſe. The witneſſes of this caſe were Dr.
" Aquenza, Dr. Porras, and the king's firſt ſur-
" geon Monſieur Legendre."

I now cloſe this narrative with a liſt of ſuch plants as Dr. Ortega tells us he found in the environs of Trillo. †

ACER Monſpeſſulanum	*Montpelier maple*
Achillea ageratum	*Sweet maudlin milfoil*
* Achillea millefolium	*Milfoil yarrow*
* Adiantum capillus veneris	*True maiden hair*
* Agrimonia eupatorium	*Common agrimony*
* Agroſtemma githago	*Corn cockle*
Allium deſcendens	- - *Garlic*
Allium victoriales	*Broad leaved garlic*
Allium paniculatum	- - -

Alſine

† Thoſe marked with an aſteriſk are likewiſe natives of this country, the Engliſh names of which are adopted from " A Botanical arrangement of all the vegetables naturally growing in Great-Britain, with deſcriptions of their genera and ſpecies, according to the ſyſtem of the celebrated Linnæus, &c." By William Withering, M. D. Birmingham, 1776.

Alſine ſegetalis	*Corn chick weed*
Althæa cannabina	*Hemp leaved marſh mallow*
* Althæa officinalis	*Common marſh mallow*
Alyſſum ſaxatile	*Yellow mountain madwort*
Anagallis monelli	*Blue flowered Pimpernel*
Androſace maxima	*Androſace with the largeſt empalement*
Anemone hepatica	*Single hepatica*
* Anthyllis vulneraria	*Double headed ladies finger*
Antirrhinum bellidifolium	*Daiſie leaved ſnap dragon*
Antirrhinum junceum	*Ruſh leaved ſnap dragon*
* Antirrhinum majus	*Snap dragon toad flax*
Antirrhinum ſaxatile	*Snap dragon*
Aphyllanthes Monſpelienſis	- - -
Apium petroſelinum	*Common parſley*
* Aquilegia vulgaris	*Common columbine*
* Arbutus uva urſi	*Perennial leaved ſtrawberry tree*
Ariſtologia longa	*Long birthwort*
Ariſtologia piſtolochia	*Scallop leaved birthwort*
Aſclepias nigra	*Black ſwallow wort*
* Aſparagus ſativa officinalis	*Cultivated ſparagus*
Aſparagus ſilveſtris	*Wild ſparagus*
* Aſperugo procumbens	*Gooſegraſs madwort*
* Aſperula cynanchica	*Squinancy woodroof*
* Aſplenium ceterach	*Common ſpleenwort*

* Aſplenium rutamuraria	*White ſpleenwort*
* Aſplenium trichomanes	*Green ſpleenwort*
Atractyllis cancellata	- - *Diſtaff thiſtle*
* Bellis perennis	*Common daiſy*
Berberis dumetorum	- - *Barberry*
Biſcutella didyma	*Buckler muſtard with a double orbicular pod*
* Borrago officinalis	*Common borrage*
* Bryonia alba	*White briony*
Buplevrum frutiſcens	*Shrubby thorough wax*
Buplevrum rigidum	- - *Hare's ear*
* Buplevrum rotundi folium	*Round leaved thorough wax*
* Buplevrum tenuiſſimum	*Fine leaved thorough wax*
* Buxus ſempervirens	*Tree box*
* Campanula rapunculus	*Rampion bell flower*
Campanula ſtricta	*Bell flower with a ſtalk branching at the bottom*
Catananche coerulea	*Blue candy lion's foot*
Caucalis grandiflora	*Baſtard parſley*
* Centaurea calcitrapa	*Starry knapweed*
* Centaurea cyanus	*Blue bottle knapweed*
* Centaurea nigra	*Black knapweed*
Cheiranthus triſtis	*Stock gilly flower*
* Chenopodium murale	*Sow bane bite*
* Chlora perfoliata	*Yellow centaury*
* Chryſanthemum leucanthemum	*Daiſy goldins*

* Cichorium

* Cichorium intybus	*Wild endive*
* Conium maculatum	*Spotted hemlock*
Ciſtus albidus	- - *Ciſtus*
Ciſtus incanus	*Honey leaved ciſtus*
Ciſtus fumana	- - -
* Ciſtus marifolius	*Hoary ciſtus*
Ciſtus populifolius	*Poplar leaved ciſtus*
Ciſtus umbellatus	- - -
Clematis viorna	*Virgin's bower*
Cleonia Luſitancia	- - -
Colutea arboreſcens	*Common bladder ſena*
* Convallaria polygonatum	*Odoriferous bellwort*
Convolvolus terreſtris	*Bindweed*
Coris Monſpellienſis	*Montpelier coris. We have no Engliſh name for this plant.*
Coronilla coronata	*Jointed bodied coluthea*
Coronilla juncea	- - *Coluthea*
Cotyledon Hiſpanica	- - -
Croton tinctorium	- - -
Cynogloſſum cherifolium	- - -
* Cynogloſſum officinale	*Stinking hound's tongue*
Cytiſus argenteus	*Low ſilvery cytiſus*
* Daphne Thymelæa	*Spurge laurel, or mezereon*
* Dacus carota ſilveſtris	*Wild carrot*
* Daucus viſnaga	- - -
Dictamnus albus	*White fraxinella*
Digitalis obſcura	- - *Foxglove*

* Dipaſcus

* Dipſacus ſilveſtris	*Clothiers teazle*
Echinops ſphaerocepha-lus	*Greater globe thiſtle*
* Echium vulgare	*Common vipergraſs*
Ephedra deſtachia	*Shruby horſetail*
* Epilobium hirſutum	*Hairy willow herb*
* Equiſetum fluviatile	*River horſetail*
* Equiſetum paluſtre	*Marſh horſetail*
Erigeron tuberoſum	- - -
* Eryſimum Barbarea	*Rocket wormſeed*
* Euphorbia characias	*Red ſpurge*
Ficus carica	*Figtree*
* Fraxinus excelſior	*Common aſh*
Fumaria enneaphylla	*Nineleaved fumitory*
* Fumaria officinalis	*Common fumitory*
* Gallium uliginoſum	*Marſh gooſegraſs*
* Gallium aparine	*Cleaver's gooſegraſs*
* Gentiana centaurium	*Centaury gentian*
* Geranium cicutarium	*Hemlock leaved craneſbill*
* Geranium ſanguineum	*Bloody craneſbill*
Geum montanum	*Mountain avens*
* Geum urbanum	*Avens bennet*
Globularia ſpinoſa	- - -
* Glechoma hederacea	*Groundivy gill*
Glycyrrhiza glabra	*Smooth liquorice*
* Gnaphalium luteo-album	*Jerſey cudweed*

* Hedra

* Hedera helix	*Common ivy*
Hedyſarum humile	- - -
Heliotrophium vulgare	*Common turnſol*
* Herniaria hirſuta	*Rough rupture wort*
Hieracium multicaule	- - *Hawkweed*
Hieracium murorum	*Golden hawkweed*
* Hieracium piloſella	*Mouſe ear hawkweed*
* Hippocrenis comoſa	*Tufted horſe ſhoe*
Hyſſopus officinalis	*Common hyſſop*
* Humulus lupulus	*Brewer's hop*
Illecebrum paronychia	*Spaniſh knot graſs*
Inula montana	*Mountain elecampane*
Inula oculus chriſti	- - *Elecampane*
* Iris pſeudoacorus	*Yellow flag*
Jaſminum fruticans	*Shrubby yellow jeſſamine*
Juglans regia	*Wallnut*
* Juncus acutus	*Marine ruſh*
Juniperus oxycedrus	*Great Spaniſh juniper*
Juniperus Phœnicia	*Phœnician juniper*
* Juniperus communis	*Common juniper*
Lavandula ſpica	*Spike lavender*
* Lepidium latifolium	*Pepper ditander*
Lepidium naſturtium aquaticum	- - *ditander*
* Liguſtrum vulgare	*Common privet*
Linum gallicum	- - *flax*
Linum narbonenſe	- - *flax*

Linum

Linum ſaffruticoſum	*Shruby flax*
Lithoſpermum frutico-ſum	*Shruby gromwell*
Lonicera caprifolium	*White honeyſuckle*
Lotus dorycinium	- - *Bird's foot trefoil*
Lotus ſiliquoſus	- - -
Lotus tetragonolobus	- - -
Lyſimachia ephemerum	- - *Looſe ſtrife*
* Lyſimachia vulgaris	*Yellow looſe ſtrife*
Malva ſylveſtris	*Common Mauls*
Malva tounefortiana	- - -
Medicago polymorpha orbicularis	- - -
* Mentha aquatica	*Water mint*
* Mercurialis annua	*French mercury*
Mercurialis tomentoſa	*Woolly mercury*
Meſpilus amelanchier	*Alpine veſpillus*
Nigella arvenſis	- - *Fennel flower*
* Oenanthe fiſtuloſa	*Water dropwort*
Olea Europaea	*Olive*
Ononis mitiſſima	*Smooth reſtharrow*
Ononis natrix	*Yellow reſtharrow*
* Ononis ſpinoſa	*Thorny reſtharrow*
Ononis tridentala	*Three thorned reſtharrow*
Ononis viſcoſa	*Clammy reſtharrow*
* Ophrys ſpiralis	*Triple twaye blador*

* Origanum

* Origanum vulgare	*Wild marjoram*
* Orobanche major	*Great broom rape*
* Papaver rhæas	*Corn poppy*
* Parietaria officinalis	*Wall pellitory*
* Pedicularis ſylvatica	*Common louſe wort*
Phillyrea auguſtifolia	*Narrow leaved phillyrea*
Phlomis herba venti	*Herbaceous Jeruſalem ſage*
Phlomis lychnitis	- - -
Phyſalis alkekengi	*Winter cherry*
Piſtacia terebinthus	*Common turpentine tree*
Plantago albicans	*White plantain*
* Plantago major	*Great plantain*
* Plantago maritima	*Sea plantain*
Plantago pſyllium	*Branching plantain*
Plumbago Europæa	*Common leadwort*
Polygala Monſpelliaca	*Montpelier milkwort*
* Polygonum convolvolus	*Binding ſnakeweed*
* Polygonum perſicaria	*Spotted ſnakeweed*
* Populus alba	*Abele poplar*
Portulaca oleracca	- - *purſlaine*
* Potentilla verna	*Spring cinquefoil*
* Poterium ſanguiſorba	*Burnet ironwort*
Prunella hyſſopifolia	*Hyſſop leaved ſelfheal*
Prunella laciniata	*Jagged ſelfheal*
* Prunella vulgaris	*Common ſelfheal*
Pſoralea bituminoſa	*Three-leaved Jupiter's beard*
Punica granatum	*Pomegranate*

Quercus

Quercus ilex	*Evergreen oak*
* Ranunculus acris	*Upright crowfoot*
Reſeda luteola	*Dyer's yellow weed*
Reſeda phyteuma	*Rampion yellow weed*
Rhamnus alaturnus	*Alaturnus*
Rhamnus catharticus	*Purging buckthorn*
Rhamnus pyrenaicus	- - - *Buckthorn*
Rhus coriaria	*Myrtle-leaved ſhumach*
Roſmarinus officinalis	*Common roſemary*
Rubia tinctorum	*Dyer's madder*
* Rumex acutus	*Sharp pointed dock*
Ruta graveolens	*Broad leaved rue*
Ruta linifolia	*Narow leaved rue*
* Salix roſmarini folia	*Roſemary willow*
* Salix helix	*Roſe willow*
Salvia ceratophylla	- - -
Salvia officinalis	*Garden ſage*
Salvia ſclarea	*Clary ſage*
Salvia viridis	*Green ſage*
* Sambucus ebulus	*Dwarf elder*
* Sambucus nigra	*Common elder*
* Samolus valerandi	*Pempernel marſhwort*
Scabioſa integrifolia	- - - *Devilſbit*
Scabioſa ſtellata	*Starry devilſbit*
Scorzonera Hiſpanica	*Scorzonera*
* Scrophularia aquatica	*Water figwort*
Scrophularia canina	*Dog's figwort*
* Sedum album	*White ſtonecrop*

* Senecio vulgaris	*Common groundſel*
* Serapias longifolia	*Long leaved helleborine*
Sideritis hirſuta	*Hairy trailing ironwort*
Sideritis incana	- - -
Sideritis ſcordivides	- - -
* Silene nutans	*Nottingham catchfly*
* Solanum dulcamara	*Woody nightſhade*
Solanum lycoperſicon	*Love apple*
* Solidago virga aurea	*Common golden rod*
* Sonchus alpinus	*Blue ſowthiſtle*
* Sparganium erectum	*Great bur reed*
Spartum ſcoperium	*Common broom*
* Spiræa filipendula	*Dropwort meadowſweet*
* Stachys alpina	*Mountain clownheel*
* Statice armeria	*Seathrift*
* Stipa capillata	*Fine feathergraſs*
* Stipa pennata	*Downy feathergraſs*
Symphytum tuberoſum	*Comfryl*
Telephium imperati	*True orpine*
Teucrium capitatum	- - *Germander*
* Teucrium chamædrys	*Wall germander*
* Teucrium chamæpitys	*Ground germander*
Teucrium pſeudochamæpitys	- - *germander*
* Teucrium ſcordium	*Water germander*
* Thalictum flavum	*Common meadow rue*
Thymus alpinus	*Mountain thyme*
Thymus maſtichina	*Maſlick thyme*
Thymus zygis	- - *thyme*

Trodilium

Tordilium apulum	*The leaſt hartwort of Apulia*
* Tragopogon porrifolium	*Purple goatſbeard*
Tribulus terreſtris	*Caltrop with chick leaf and prickly fruit*
* Trifolium melilotus officinalis	*Melilot trefoil*
* Trifolium pratenſe	*Honeyſuckle trefoil*
* Triglochin maritimum	*Spiked arrowgraſs*
* Triglochin paluſtre	*Marſh arrowgraſs*
* Tuſſiloga farfara	*Coltsfoot butter bur*
* Ulmus campeſtris	*Common elm*
* Valeriana calcitrapa	*Valerian with leaves, like thoſe of the ſtar thiſtle*
* Veronica anagallis aquatica	*Pimpernel ſpeedwell*
* Veronica beccabunga	*Brooklime ſpeedwell*
* Veronica hederifolia	*Ivy leaved ſpeedwell*
* Verbaſcum Thapſus	*Great mullein*
* Verbena officinalis	*Common vervain*
* Viburnum lantana	*Pliant meal tree*
* Vinca major	*Greater periwinkle*
* Viola odorata	*Sweet violet*

Beſides the above ſpontaneous plants, the following are cultivated in gardens

Amygdalus perſica	*Peach tree*
Cratægus oxyacantha	*White hawthorn*

Prunus

Prunus domeſtica	*Plumb prune*
Prunus ceraſus	*Black cherry prune*
Pyrus communis	*Pear apple*
Pyrus cydonia	*Quince*

Vitis

☞ Since the environs of Trillo had induced Dr. Ortega to give a catalogue of plants in that neighbourhood, in that neighbourhood, it inſenſibly engages me to add a few words reſpecting the ſtudy of botany in that kingdom, which hitherto had made ſo little figure as to draw down very pointed reflections from Linnæus, who ſays, " Hiſpanicæ floræ nullæ nobis innotuerunt adeoque plantæ iſtæ rariſſimæ in locis Hiſpanice ſertilliſſimis minus detectæ ſunt. Dolendum eſt, quod in locis, Europæ cultioribus tanta exiſtat noſtro tempore barbaries botanices! puuciſſimas iſtas plantas, quæ nobis in Hiſpania & Portugalia conſtant, debemus curioſis claſs iii. Tournefortio et paucis aliis." Linn. biblioth. botanica, part vii floriſtæ § viii. Hiſp. pag. 96. which tended greatly to raiſe the emulation of the Spaniards; and while that celebrated botaniſt was taking meaſures to obtain a permiſſion for one of his pupils to travel through Spain, he received a meſſage from the Spaniſh ambaſſador at the court of Stockholm, which greatly ſurpriſed him, as it intimated the deſire of his Catholic majeſty to have a botaniſt recommended by Linnæus. This appears to have been owing to ſome Engliſh gentlemen then at Madrid, and among them Robert More, Eſq; F. R. S. who dining with the prime miniſter Don Joſeph de Caravajal, had been aſked their opinion of Spain by that miniſter, who perceiving that the remark of Linnæus was not without foundation, and being informed that a Spaniſh flora would turn out as new as it was rich, determined that his country ſhould ſoon be free from ſuch a reproach; this was afterwards com-

Vitis vinifera	*Vine*
Carthamus tinctorius	*Baſtard ſaffron*
Linum uſitatiſſimum	*Common Flax*

communicated to Linnæus by Mr. More in his tour through Sweden, and accounted for the application above-mentioned. Peter Læfling, the favourite ſcholar of Linnæus, was accordingly fixed upon for this expedition, and was received in Spain in the moſt gracious manner. His ſurpriſe was great to find many lovers of botany at Madrid, particularly Don Joſeph Ortega, ſecretary to the phyſical academy, Don Juan Minuart, chief apothecary to the armies, Don Joſeph Quer, firſt ſurgeon to the king, who had a ſplendid botanical garden, and a moſt elegant collection of plants, Don Chriſtoval Velez, apothecary of the college of phyſicians, who was poſſeſſed of a choice collection of botanical books, with a grand hortus ſiccus, and had drawn up a flora Madritenſis. Læfling was greatly careſſed by theſe gentlemen, and in return paid a handſome compliment to each, by calling four new plants after their names. Linnæus has taken theſe names into all the ſubſequent editions of his *genera* and *ſpecies plantarum*, and into the laſt edition of his *ſyſtema naturæ*. Læfling ſtaid about two years at Madrid, making occaſional excurſions, during which time he collected above 1300 diſtinct ſpecies of Spaniſh plants. By orders of the court he embarked at Cadiz, in the year 1754, for South America, where he unfortunately died, 22d Feb. 1756, and Linnæus publiſhed his letters. See Iter Hiſpanicum, Holmiæ, 1758, and a further account of Peter Læfling's life and botanical writings, in the 2d vol. of Boſſu's travels in Louiſiana, tranſlated by J. R. Forſter, F. A. S. London, 1771.

LETTER X.

The royal ſeat and gardens of St. Ildefonſo, with ſome account of the city of Segovia.

WHOEVER has ſeen the gardens of Aranjuez will not think it extraordinary that the ſovereign of Spain ſhould have another agreeable ſeat in the fertile dominions of his crown, but when a traveller has croſſed the craggy and bleak mountains of Guadarrama, it will be a matter of ſingular ſurpriſe to behold one of the moſt dreary rocks embelliſhed with an agreeable villa, where the mines of Mexico have been laviſhed to effect the alteration; ſuch is the royal ſeat of St. Ildefonſo; for in few parts of the world, the powers of art have been more ſtrenuouſly exerted to correct the rugged ſtate of nature, and convert a horrid rock into a ſumptuous garden, decorated with beautiful fountains, throwing up water to a great height, like thoſe of Verſailles; while a variety of trees, brought from different parts of the world, furniſh ſhady walks, in a ſpot unfavourable by nature to all kind of vegetation; ſhewing to what the art of man can attain, and fully evincing the efforts of Philip the Vth. who at the expenſe of millions of

of dollars changed a barren and ſolitary mountain, into one of the moſt deſirable ſpots in his kingdom; yet not without thoſe inconveniencies which all the power of art cannot conquer; for on account of its lofty ſituation, the night air, even after the hotteſt ſummer's day, is ſo piercing, that it makes precaution neceſſary, to guard againſt its ſudden and pernicious effects. In other reſpects nothing can be more reviving during the ſummer heats, than the ſhade of theſe gardens, invigorating the languid courtier, whoſe ſpirits are further revived by the coolneſs of the groves, added to the moſt limpid water that eyes can behold, in ſome places flying up into the air, to an immenſe height, in others rolling down in torrents, which, when catched by the rays of the ſun, ſeem like ſo many ſheets of liquid ſilver, of a moſt amazing brightneſs. As the cold air of this place keeps every thing back, the king finds a new ſpring after he has left Aranjuez, while his ſubjects are dying with heat at Madrid. The earlieſt fruits are but juſt ripe in Auguſt at St. Ildefonſo, carnations and roſes then adorn the parterres; September is the ſeaſon for ſtrawberries, raſpberries, currants, and barberries; and ſnow lies on the mountains till the beginning of June. Many ſprings run down from the ſummit, and ſides of the mountains, and are collected into a conſiderable baſon at the upper end of the garden, to

which they have given the name of *El Mar*, "the ſea;" from whence they are diſtributed to all the different fountains and water works, the whole garden being on a ſlope, about two miles in circumference. Other ſprings with two brooks, form the little river Ereſma, abounding in ſalmon trout, where the king often diverts himſelf with fiſhing, under the ſhade of thickets, beautifully variegated by the pencil of nature.

The dreary mountain at the top of theſe gardens, is a kind of rock compoſed of clay and fine ſand, which by degrees crumbling and mixing with rotten leaves and roots, forms that light coat of earth, which juſt covers the rock, and gives nurture to the firs and other trees and ſhrubs. The foot of the mountain is of granite, and ſerves for building, ſometimes for mill-ſtones, though rather too ſoft for this purpoſe, ſtanding in need of frequent repairs. They get vegetative earth on the North ſide, about a hundred paces from the green rails of the flower garden, which being further cheriſhed by manure, is laid a foot high on the rock, and by dint of cultivation and care, they are enabled to raiſe flowers and fruits, whoſe roots hardly touch the barren ſoil of the place.

Mr. Bowles informs us, That when the late queen mother lived at St. Ildefonſo, the Infant, Don Lewis, her ſon, had an aviary in the gardens, filled

filled with a great variety of beautiful birds; one place was allotted for woodcocks, where they lived for ſeveral years. In the middle of their cage a channel of ſpring water was introduced, which kept up a conſtant freſhneſs of verdure; a fir tree, ſtood in the centre, ſurrounded with ſhrubs, and they were daily ſupplied with freſh clods of turf, full of worms, which, though they hid themſelves ever ſo much therein, the bird would inſtantly diſcover by the ſmell, and driving in his long bill bring them immediately out, then raiſing his head towards the ſky, and extending the worm gently the length of his bill, would let it ſlide down ſoftly, without any appearance of deglutition; all which was performed with the utmoſt facility, as if totally unemployed, without ever miſſing its aim, and ſhould the woodcock be killed at that moment, theſe nauſeous worms would immediately contribute towards the forming a delicious repaſt at the moſt elegant tables.

The palace of St. Ildefonſo has a noble collection of excellent pictures. In the gallery there are many fine ſtatues bought at Rome, out of the collection of queen Chriſtina of Sweden; amongſt which the groupe of Caſtor and Pollux ſacrificing, and a fawn, are undoubtedly the moſt beautiful. The ſtatues in the garden are chiefly of marble of Granada, ſome few of marble of Carrara: there is nothing elſe remarkable except the fine

fine looking glaſſes made in the king's glaſs houſe at St. Ildefonſo, which ſupplies all the palaces; they have here the largeſt tables perhaps in the world for running plate glaſs. The greateſt being 145 inches by 85, and its weight 405 arrobes. The ſmaller is 120 inches by 75, and weighs 380. This curious art was firſt invented by the Sieur Abraham Thevart, who propoſed it to the court of Verſailles in 1688, and is performed much like the caſting of ſheet lead by the plumbers, by which means they are enabled to make glaſſes of double the dimenſions of thoſe, by the Venetian method of blowing, beſides other improvements.

At a ſmall diſtance from the palace, at a place called the *Mata*, near the powder magazine, there is a vein of quartz, which appears above ground, running from South to North for about half a league, till it enters and loſes itſelf in the oppoſite mountain. A piece of this quartz, of about ſix pounds, being cut, ſeemed very curious, being half tranſparent, and almoſt as fine as rock cryſtal, having a kind of ſtripe, four fingers broad, between two coats, of a darker quartz. On following this vein ſeveral pieces of the ſame quartz appeared covered with rock cryſtal of a milk colour, forming thoſe veins called by miners, "noble veins." Mr. Bowles acknowledges he did not more particularly examine, or make any eſſay in this

this place; and yet he tells us, he conjectures, and infers that it is an unwrought mine of gold.

The environs of St. Ildefonſo and particularly the foot of the mountain are covered with a remarkably fine ſort of graſs, to which they give the name of *coſquilla*, from its effect of tickling the hand when touched. The root is about eight inches long, cylindrical, and about the ſize of a pin, diminiſhing towards the point; in the middle of this root, which is ſmooth, the ſtem ſprings up, bearing ſmall capſules at their points, incloſing the ſeed; in many places, and particularly at Segovia, they make uſe of it at Chriſtmas for ornaments in the churches, to imitate verdure; alſo little brooms are made with it to ſweep away duſt; it likewiſe grows in abundance in the plain of Olmedo, and is ſeldom to be ſeen elſewhere.

It is only a few hours ride from St. Ildefonſo to the city of Segovia. The naturaliſt will meet with many objects of curioſity in the environs of this city, obſerving its different ſpecies of marble, granite, limeſtone, clays, and three ſorts of ſand.* It's famous Roman aqueduct remaining ſo perfect to this day, will prove the ſolidity of its materials, more effectually than long diſſertations. Monſieur Seguier's

* Mr. Bowles enters into many details reſpecting the variety of ſand, clays, &c. in the environs of Segovia, which, not being conſidered as univerſally intereſting, are omitted.

Seguier's method of diſcovering the inſcription on the *Maiſon Quarree* at Nimes, the invention of which is originally due to that celebrated antiquary, Monſ. Peyreſc, might likewiſe ſerve to diſcover that, which was formerly on the aqueduct of Segovia, for the place of the inſcription, marks, and holes of the letters, are yet very viſible. ‡ This place is much dwindled at preſent from what it was formerly. The cathedral is handſome and has been lately repaired; the mint in this city only ſerves for copper: gold and ſilver are coined at Madrid and Seville. The alcazar or caſtle is curious and in a fine bold ſituation. The unfortunate Duke de Ripperda was confined here, they ſhew you the dark room, from whence he made his eſcape, and the broken lock on the door is ſtill in the ſame ſituation.

LETTER

‡ The little ſquare in Segovia, from whence you have a principal view of the aqueduct, is called El Azoguejo de Segovia, as a diminutive of the Arabic word Zocq, which ſignifies a ſquare or market-place. This place is mentioned in Don Quixote, and ignorant tranſlators, becauſe the Spaniſh word *azoque* alſo ſignifies quickſilver, call this place the Quickſilver Houſe of Segovia. Delpino, in his Spaniſh dictionary tells us, without any authority, that a market is ſo called, becauſe the people in it are continually moving like quickſilver.

LETTER XI.

Departure from Madrid for the city of Burgos.

ON leaving Madrid, to go into Old Caſtile, the firſt grand objects which ſtrike the eye of a naturaliſt, are the mountains of Guadarrama, that divide the two Caſtiles; you leave the famous Eſcurial on the left, and following the new road, aſcend theſe lofty mountains, whoſe tops, and particularly where the marble lion ſtands, are chiefly covered with fern, which is common here, though ſcarce in other parts of this country. From the higheſt part of the road, there is an extenſive proſpect of Old Caſtile, which is more elevated than New Caſtile, and forms a ſpacious plain not unlike a great ſea. An eaſy deſcent leads to the *Hermita del Chriſto del Caloco*, where grey and blue marble is dug out of the adjacent mountain, and is found almoſt cloſe to the road. The mountain terminates at Villacaſtin, but the grand plain only commences at Labajos, where they ſow the peas called *Garbanzos* in a fine blackiſh ſoil, but they are not equally tender and large every year, no more than at Salamanca or Zamora; for though the

the land is good for this ſort of pulſe, its ſucceſs depends much upon the weather.

A new bridge has been lately built over the river Almarza, whoſe banks are lined with poplar and elm; half a league further there is another plain, without a ſingle tree, but water is found at two or three feet depth; ſo that a very ſlight plough anſwers the purpoſe, it being ſufficient to tear away the weeds, to ſecure a good crop of wheat; this is generally the caſe in Caſtile, where they have fine harveſts without being obliged to wait for rain to ſow their corn, the vicinity of water and ſtrong dews being ſufficient to fertilize the ſoil, the reverſe of what happens in the ſouthern parts, where the water is deep under ground, the ſoil dry and tough, and ſtrong ploughs muſt be uſed; beſides waiting for rain, or an appearance of its falling, otherwiſe the grain hardens, and is in danger of being devoured by birds, inſects, or rats. In theſe plains, the villages are numerous, as well as the vineyards, the ſoil is ſandy, and yet, by means of the nearneſs of water, produces plenty of ſhumach; every houſe has its garden, and the ſides of the road are chequered with the lychnis, and oak of Jeruſalem. Though the plain I have juſt mentioned is of about eight leagues extent, without the appearance of a ſpring, or a brook, the inhabitants drink the waters of wells

wells and ciſterns, without any bad conſequences, or being troubled with agues, as the water does not ſtagnate, but has a current near the ſurface, and regains from a higher region, what it loſes by evaporation. This accounts for their having ſuch fine paſtures and graſs in Caſtile, and ſo many herds of cattle, with ſuch a variety of game, birds, and wild and domeſtic animals.

Near Valladolid there are groves of fir trees terminated by an extenſive plain, covered with green wormwood, oak of Jeruſalem, and thyme, of that beautiful ſort called thymus legitimus Hiſpanicus. The city of Simancas * appears on the left,

* The records of the kingdom having been found to be in great confuſion, and a large collection of valuable papers diſcovered at Valladolid, Philip II. ordered his chief architect, Juan de Herrera to conſtruct proper apartments at Simancas for their preſervation, and they were diſpoſed of in nine grand diviſions, or apartments, accordingly. In the ſtrongeſt, called the *Cubo*, were thoſe relating to Granada, Indies, right to Naples, Navarre, Portugal, Vicariate of Siena, monarchy of Sicily, eſtabliſhment of the inquiſition, wills of kings, capitulations of peace with France, with Mooriſh kings, with the Houſe of Auſtria, marriages of Catholic kings, grants of military orders, and ſtate papers from the time of Ferdinand V. all which are preſerved in wooden caſes fixed in the wall. In the year 1592 the king viſited them. All the proceedings relating to the impriſonment and death of Don Carlos his ſon, were depoſited in a trunk carefully locked. Another apartment

left, about two leagues diſtance, as you enter the once famous city of Valladolid, ſituated on the banks of the Piſuerga. This large city, excluſive of colleges and ſome churches that have good remains of gothic architecture, now only exhibits the diſmal remains of its former grandeur; and the palace where Philip the ſecond was born, has nothing but bare walls, where bats and ſpiders quietly inhabit the manſions of the great emperor Charles, and the Philips his progeny.

Every thing is barren with dreary aſpects of flat topped, barren ſand hills as far as Caveron, where they have vineyards and make a tolerable light red wine. Leadwort is common on the ſide of the road, whoſe leaves pounded, are ſaid to be good againſt the gangrene. The vineyards are numerous,

ment was built for accounts, and other office papers; in another were papers relating to royal palaces, law ſuits, grants, knights of military orders, and Indies; another for records of corporations; and in another the memorials and letters of kings, princes, and ſtates, concerning Flanders, ſince the rebellion. Vida de Philipe IId. Por Luis Cabnera de Cordova. Madrid, 1619. The American papers alone fill the largeſt apartment of this *Archivo*, and are ſaid to compoſe 873 large bundles. The proſpect of ſuch a treaſure had excited the moſt ardent curioſity of the elegant hiſtorian of America, but the proſpect of it was all that he enjoyed. Preface to Dr. Robertſon's hiſt. of America.

numerous, near the town of Duenas,* which belongs to the Duke of Medina Celi. The plain extends to Rodrigo, whoſe environs produce a little lavender, two ſorts of ſhrubby Jeruſalem ſage, with a ſage leaf, and meadow ragwort, which are the only plants the country affords. All the territory of Campos is ſo bare and deſtitute of trees, that the inhabitants are obliged for fuel, to burn vineſtocks, ſtraw, dung, and the few aromatic ſhrubs they can find; their kitchens are like ſtoves, and they ſit round them on benches, giving to theſe wretched hovels the emphatic name of *Glorias*. A ſolitary elm or a walnut tree now and then appears near a church, a ſure ſign that water is not far from the ſurface, and that its roots have partaken of it. When this happens, independent of every viciſſitude of weather and climate, other trees would thrive in like

* A Spaniſh proverb ſays, "*Ruyn con ruyn que aſſi ſe caſan en Duenas*—Mean with mean, for thus they marry in Duenas." In 1506, Ferdinand of Aragon, after the death of his wife Queen Iſabella, of Caſtile, was married here a ſecond time to the Lady Germana de Foix, daughter of John de Foix, viſcount Narbonne, by Maria, ſiſter to Lewis 12th of France. This match having been made by the political Ferdinand, to cement his union with France, might perhaps diſpleaſe the Caſtilians, and have given riſe to the proverb. At preſent Duenas ſeems ill prepared for ſuch ſplendid gueſts, and indifferently provided, even to celebrate the nuptials of a reputable farmer.

like manner, and the country might be rendered ſhady and pleaſant, inſtead of being the moſt deſolate in Europe; but it is no eaſy matter to conquer prejudices, or diſſuade the Caſtilians from that erroneous notion, that an increaſe of trees would only augment the number of birds to eat up their corn, and devour their grapes.

On approaching the hills, the pebbles which had almoſt diſappeared, ſhew themſelves again, encreaſed both in number and bulk, and although from Labajos they were ſcarce larger than oranges, they are now double that ſize, and rounded, which the others are not, covering the tops of the hills: it is ſomewhat ſingular, that theſe ſtones, which are of a fine ſandy grain, and are found every where in this province, ſhould be of the very identical ſort and colour, as thoſe of La Mancha, Molina de Aragon, and other parts of Spain.

The country from hence to Burgos, produces plenty of wheat, and ſome flax; the road is a continual though gentle aſcent, with much conglutinated ſand ſtone, of which there is a ſort near Burgos, ſo firmly conglutinated with ſmall pebble that it forms a marble like the *Brecca*,* and takes a good poliſh, ſpecimens of

* The breccia filicia is the plumb pudding ſtone. This ſtone is of a very elegant appearance, when cut and poliſhed;

of which may be ſeen in the choir of the cathedral of Burgos. The environs of this ancient city are remarkably pleaſant, and ſhady, with many beautiful avenues; the hills are no longer flat-topped, but have a chearful appearance; the waters are pure and ſalubrious, the rivers abound with trout, eel, and cray-fiſh. Though the air is ſharp and rather piercing, it is eſteemed very healthy, and Caſtile may juſtly be reckoned the country of partridges, hares, rabbits, and lamb. They do not ſow their wheat before Auguſt, nor are grapes ripe before that time. The wild thiſtle with yellow flowers, is ſeen every where near the roads, and plenty of meadow ſweet.

The city of Burgos is ſituated on the ſide of a hill, at the bottom of which, the river Arlanzon waſhes its walls, and has three ſtone bridges over it. The cathedral is a magnificent gothic ſtructure, and one of the fineſt in Spain. The city is well inhabited by ancient nobility, and was formerly the reſidence of their kings. It gave birth to that illuſtrious hero Fernan Gonzales, and near the place where his houſe ſtood, a triumphal arch has been erected to his memory at the expenſe of the city, with the following inſcription:

ed; it is found in England. See Eſſay towards a ſyſtem of minerology, by Axel Fred. Cronſted; ſecond edition. London, 1772. Sect. CCLXXIII.

FER-

FERNADO GONSALVI CASTELLÆ ASSERTORI. SVÆ ÆTATIS
PRÆSTANTISSIMO DVCI MAGNORVM REGVM GENITORI
SVO CIVI INTVS DOMVS AREA SVPTV PVPLICO AD ILLIVS
NOMINIS ET VRBIS GLORIÆ MEMORIĀ SEMPITERNAM.

The pariſh church of Santa Gadea (St. Agatha) more ancient than the cathedral, is remarkable for being the place, where that renowned champion Ruy Diaz de Bibar alſo a native of Burgos, commonly called the *Cid Campeador*,* obliged king Alfonſo the 6th, before he was proclaimed, to ſwear three times publicly, that he had no concern in the murder of the late king Sancho his brother, at the ſiege of Zamora, where he was treacherouſly ſlain by a Spaniſh knight, whoſe name was Heliel Alfons, though he is uſually called Velido Dolfos. The words of this extraordinary oath were as follows.

You come to ſwear, that you had no hand in the death of my lord the king, that you neither killed him, nor gave counſel therein.

The king and his nobles anſwered, *Amen.*

If

* The title of Cid is derived from an Arabic word which ſignifies Lord. See Don Quixote. It muſt have been common in thoſe days, for in the Spaniſh chronicles, it is ſometimes given to Jews.

If otherwiſe, may you ſuffer the ſame death as that of my lord; may a villain kill you, let him not be a gentleman, nor born in Caſtile, but come from foreign parts, nor be of the kingdom of Leon.

The king and his nobles anſwered, *Amen.* †

After this ceremony, Alfonſo was ſolemnly proclaimed king of Caſtile, Leon, Galicia, and Portugal, in the preſence of the infanta his ſiſter, and the prelates, and nobles of his kingdom.

As Burgos was formerly a place of ſo great importance in the affairs of Caſtile, it is impoſſible to look with indifference on theſe venerable remains, or view its magnificent cathedral, without calling to mind ſome particular period of its eccle-

 ſiaſtical

† At the ſecond time of tendering the oath the king changed colour, and at the third he was greatly diſpleaſed, ſaying, "Rodrigo Diaz why do you preſs me ſo hard and make me ſwear to day, when you will come to kiſs my hand to-morrow;" to which that warrior replied, "Yes, Sir, if my ſervices are properly conſidered, for in other kingdoms, knights are alſo rewarded, and you muſt do the ſame, if you mean to retain me in your ſervice;" which ſpeech the king never forgave, and ſoon after ordered him to retire out of the kingdom, allowing him only nine days for that purpoſe. The Spaniſh chronicles are full of the achievements and feats of the *Cid.* He died in 1099, and is buried in the church of St. Pedro de Cardena, near Burgos, where his memory is held in the higheſt veneration.

ſiaſtical hiſtory; none ſeems more ſtriking, than when the ſon of a Jew was raiſed to that ſee, and became one of its moſt illuſtrious prelates. Such was *Paulus Burgenſis*, whoſe extraordinary elevation is worthy of notice. This great man was the ſon of a rich Jew at Burgos, of the tribe of Levi, whoſe name is not mentioned in hiſtory. In the year 1376 Paulus married Joanna, of the ſame tribe as himſelf, by whom he had four ſons and one daughter. Gonzalo, his eldeſt, biſhop of Plaſencia and Siguenza; Alfonſo, who ſucceeded his father in the ſee of Burgos; Pedro, Alvaro, Sancho, and Maria, who all at the converſion of the father, took the name of *Santa Maria*, and when Paulus was made biſhop of Carthagena, they aſſumed the ſirname of *Carthagena*.

Paulus had been for many years firmly attached by education, and principle to the Jewiſh religion, and being a man of great learning, enforced his opinions with vehemence. At this time the Jews profeſſed their religion publicly in Spain, and held offices of truſt and emolument. At the age of forty, Paulus Burgenſis embraced the Chriſtian religion, and on the 21ſt of June, 1390, was publicly baptiſed in the cathedral, by Don Garci Alfonſo de Cobarruvias, treaſurer of the church, whoſe coat armour was aſſumed by Paulus, in memory of this event, which was a *lilly argent, in a field*

field vert, deſiring to have the name of Paul in baptiſm, from his particular attachment to the ſacred writings of that great apoſtle, of whom he uſed to ſay, " Paulus me ad fidem convertit. Pauli mihi indebile nomen una cum caractere aſſignari depoſco."

His two ſons were baptized at the ſame time, his eldeſt being eleven, and the youngeſt only two years of age. His father had been dead ſome time in the Jewiſh religion, and his mother ſtill continued ſo with remarkable ſteadineſs, though ſhe yielded at laſt to the arguments of her ſon, but his wife was inflexible; for which reaſon the marriage was diſſolved, and Paulus took upon him the clerical habit, purſued his ſtudies with new zeal, and ſoon after went to Paris, where he received the degree of maſter of arts, and continued writing to his late wife, uſing every argument to convince her of the ſublime truths of the Chriſtian religion, in which at laſt he had the happineſs to ſucceed. He then ſet out for Avignon, was made archdeacon of Trevino, in the ſee of Burgos, and a canon of Seville. At the age of fifty-two king Henry the third of Caſtile, appointed him biſhop of Carthagena, and he became ſo great a favourite with that monarch, that he made him chancellor of the kingdom, one of the executors of his will, and tutor to his ſon and

heir, John, then only two years of age, and afterwards king of Caſtile: finally Paulus was nominated to the ſee of Burgos with univerſal approbation, which he refuſed for a twelvemonth, but at laſt acquieſced, and took poſſeſſion of, in 1415, being ſixty-five years of age. After the ceremony was performed in the cathedral, he was received with great ſplendour in his palace, by his mother, his late wife, and all the nobility. He was a rigid perſecutor of the Jews, whom he not only inveighed againſt in his writings, but uſed all his endeavours to ſtrip of their privileges; if he did not always ſucceed, he obliged them however to dwell by themſelves, in particular parts of the town, and his pupil, King John, drove them out of his kingdom; * amongſt the many treatiſes publiſhed againſt them by the biſhop of Burgos, the moſt remarkable was one intitled "Scrutinium ſcripturarum," reprinted at Burgos in folio, in 1591. At laſt, this venerable prelate, worn out

* England was the firſt country that expelled the Jews (in 1281, the 19th of Edward 1ſt.) They had a ſimilar fate in France much about that time; Spain baniſhed them next, and afterwards Portugal. Oliver Cromwell permitted them to return to England, and the generality of Chriſtians now treat them with more moderation. The popes receive them in Rome, and they ſleep in tranquility cloſe to the ſhrine of St. Peter; but the Spaniards and Portugueze ſtill look on that diſperſed people with an univerſal and national abhorrence.

LETTER XII.

Remarkable objects on the road from Burgos to the provinces of Alaba and Guypuſcoa, as far as Irum, the laſt town on the frontiers of Spain, towards France.

YOU no ſooner quit Burgos, than new objects appear worthy of attention; for, in croſſing an extenſive plain, the gum-bearing ciſtus is ſeen in great plenty; † it is an evergreen, with long, narrow leaves, gummy and gloſſy; the flower is inodorous, and compoſed of five white petals, of the ſize of a common roſe; each petal having a little purple ſpot on the tip of it. The old branches diſtil a liquid matter, which the heat of the ſun condenſes into a white ſugary ſubſtance, like a piece of gum, of the ſize of one's finger, and yields a true manna; it is gathered and eat greedily by ſhepherds and boys. The Spaniards were little appriſed of the advantages to be drawn from this plant, till of late years, when, on the repreſentation of the royal college of phyſicians at Madrid, in 1752, orders were given to two of its members, to make a further inveſtigation of this production; theſe were Don Joſeph Minuart, and

† The ciſtus ladaniferus of Linnæus.

and Don Chriſtoval Velez, the former went into the mountains of Avila, and the latter into ſeveral diſtricts of Andaluſia; it was found that Spain alone could procure manna ſufficient to ſupply all Europe, equal in goodneſs to that of Calabria, in the kingdom of Naples; for not only an incredible quantity of it, was gathered in the parts above-mentioned, where it is formed about the dog days, but likewiſe in the mountains of Aſturias, Galicia, Cuenca, Aragon, and Catalonia, though no uſe had hitherto been made of it.*

The deſcent to Monaſterio leads to a valley fertile in corn, ſoon after the diſtrict of Bureba begins,

* Manna is a medicinal drug, of great uſe in the modern practice, as a gentle purgative, and cleanſer of the firſt paſſages, and is now become a conſiderable article of trade. It may be reckoned among the number of gums which exſuding from the juice of a tree, and mixing with ſome ſaline particles of air, is condenſed into thoſe flakes in which it is brought to England. The manna of Calabria is not gathered from the ciſtus, but from the branches of the aſh tree; and we are aſſured by Robert More, Eſq; of Lindley, in the county of Salop, that the Neapolitans have many ways of counterfeiting the ſeveral appearances of manna, and that the moſt common, is with Glauber's ſalt, and ſugar, with a ſmall mixture of manna. It yields to his Sicilian majeſty ſo large a revenue, and he is ſo jealous of it, that during the ſeaſon, the woods are guarded by ſoldiers, who even fire upon people, that come into them, and the ſtealing of the liquor is death. "See the method of gathering the manna in the kingdom of Naples, in Rolt's dictionary of commerce."

CATHEDRAL OF BURGOS.

A A. Steeples of the principal Front. B. Tower in the Centre, with eight Pinnacles. In the Figure of Santiago C Chapel of the Constable D D. Archbishop's Palace.

threatening, as it were, every moment, to fall on his head, but now is ſafe and commodious, the paſſage having been conſiderably widened. The new road from Bilboa reaches as far as Pancorvo, a diſtance of ſeventeen leagues, over a continual chain of mountains.

The boundaries of Old Caſtile are at Miranda de Ebro, three leagues beyond Pancorvo, where there is a bridge over the Ebro;* on the other ſide of which, the province of Alaba begins, whoſe inhabitants have likewiſe made a fine road at their own expenſe, to the confines of Guypuſcoa. The road continues almoſt to Vitoria, bordering on the river Zadorra, in which the water lilly grows plentifully. The hills are of ſmall, and various coloured calcareous ſtone, conglutinated together: the plants are the arbutus uva urſi, or perennial leaved ſtrawberry tree, box, thorny furze, thorny reſtharrow, the kermes oak, and many ſorts of orchis. The firſt village in the province of Guypuſcoa, is Salinas, ſo called from its briny ſprings, which they evaporate with a boiling heat, and make ſalt. It is remarkable, that ſuch ſprings in

* This bridge, which had been ſo much damaged, and part of it carried away by inundations, when Mr. Swinburne paſſed this way, and was obliged to go over in a ferry, was entirely repaired when I went over it in July, 1778.

in France, and Lorraine, are always in vallies, but in Spain are conſtantly found on the tops of mountains, or in elevated places. This juſt mentioned, is on a very high hill, with numerous petrefactions of ſhells, in a kind of blueiſh marble, veined with ſpar, which has been uſed in making the road. This hill of Salinas is the higheſt part of Guypuſcoa.

From hence, it is four leagues to Mondragon, ſo famous for its iron mine in this neighbourhood, of which I ſhall ſpeak more particularly hereafter. From Mondragon it is a journey of ſix leagues to Legaſpia, paſſing by a forge on the banks of the river *Onate*, where they mix the ore of two mines, viz. that of Somorroſtro in Biſcay, noted for the flexibility of its metal, with the ore of this neighbourhood, which being more abundant and hard, takes forty hours in roaſting, and is then fuſed once without any caſtina, § getting at each fuſion a quintal of iron, following the ſame method obſerved with the iron of Somorroſtro, as will be deſcribed in a ſubſequent letter.

Onate is a populous and affluent town; the church, the colonade, and ſtatues of the college, are

§ Caſtina is a hard calcareous ſtone, of a whitiſh grey, uſed in forges, where iron is fuſed, in order to abſorb the ſulphureous acid, that mineralizes the iron, and renders it brittle.

are of ſand-ſtone, full of Mica; ‡ the ſoil of the hills, and vallies, is a tenacious clay, formed by the total decompoſition of the ſand-ſtone, ſlate, and rotten vegetables. The farmers uſed to manure it with lime, to looſen the ſtrength of the clay, and abſorb its acid, but they now begin to uſe marl.

It is five hours and a half from Legaſpia to Villafranca, paſſing by Villareal, where the houſes are of ſand-ſtone. They prune the oaks every where in this country, in the ſame manner as the mulberry trees in Valencia, that they may throw out more branches, to make charcoal for the forges, and they cut them every eight or ten years, as in Biſcay. There are few ſprings in all theſe hills, though it ſo frequently rains, owing to the tenacity of the ſoil, which impedes the filtration of the water, ſo that they are obliged to drink melted ſnow from the mountains, yet without being troubled

‡ Mica, the glimmer, daze, or gliſt. See Cronſtedt's mineralogy, ſect. xciii. London, 1772. Mica, or talk, is an earthy or ſtony ſubſtance, conſiſting of thin, flexible, ſhining plates; micas have a ſoft touch, reſembling that of unctuous ſubſtances. They are not ſoluble by acids. They are incapable of eliciting ſparks when ſtruck by ſteel, as flints do, for which reaſon they are called *Apyri*, that is, without fire; nor do they form a tenacious paſte with water, as gypſum does. Mica is therefore neither a calcareous, ſiliceous, argillaceous, nor gypſeous earth.

bled with the full-throat, ſo often attributed to this cauſe, though more probably ariſing from obſtructions in the glands for want of perſpiration.* Two thirds of the inhabitants of this province, paſs the days and nights in their ſmoaky cabins, without chimneys, affirming, that the cloſeneſs, and ſmoak, are conducive to health, as they diſſipate dampneſs, and promote perſpiration. The inhabitants are certainly not only robuſt, but are even ſeldom troubled with rheums: they are moreover chearful and ſociable, having nothing of that ſhyneſs obſerved in the meridional provinces.

From Villafranca,† it is three leagues to Toloſa, one of the three principal cities of Guypuſcoa,

* An ingenious traveller lately returned from Switzerland informs us, that he had been at ſeveral places where the inhabitants drink no other water than thoſe of rivers and torrents which deſcend from the *Glacieres*, and yet are not in the leaſt ſubject to the full throat; ſo far from it, he had been told, ſnow water was eſteemed a preſervative, as well as the clear air of the mountains, and that they had been obſerved to diminiſh in elevated places, though they always increaſed in the vallies, when once they had begun. —Sketches of the natural, civil, and political ſtate of Switzerland, by Will. Coxe, A. M. London, 1779.

† Neither Legaſpia, Onate, Villa[illegible], Villafranca, nor Irum, are to be found [illegible] map of Spain, by Thomas [illegible] king, and of [illegible] it to the

coa, and from hence the road continues in ſight of St. Sebaſtians, and Paſage, to Irum, the laſt town in Spain. Near this place the river Bidaſoa enters the ocean, dividing Spain from France, and at a ſmall diſtance from its mouth, the iſland of Pheaſants is remarkable for having been the place where the Pyrenean treaty was concluded, in 1660, between cardinal Mazarin, on the part of France, and Don Lewis Mendez de Haro y Guzman, on the part of Spain, and the match was agreed upon, between Lewis XIV. and Dona Maria Tereſa, daughter of Philip IV. mother to the Dauphin, and grand-mother to the Duke of Anjou, afterwards Philip V. of Spain, father to his preſent Majeſty Charles III.

LETTER

the Prince of Aſturias, ſaying of this map, that it is, "conſtruido con lo mejor, que ay impreſſo, manuſcrito, y memorias de los naturales;" but on the "mapa de las carreras de poſtas de Eſpana," dedicated to Charles the 3d, by Don Ricardo Wall, in 1760, and engraved by the ſaid Thomas Lopez, I find Villafranca, Toloſa, and Irum, but not Legaſpia, Onate, or Villareal.

LETTER XIII.

Of the iron ore of Mondragon, in Guypuſcoa, with ſome account of the famous Toledo blades, ſo greatly valued formerly in England.

I Shall now relate ſome particulars concerning the famous iron mine of Mondragon, which is about a league diſtant from the town of that name, in Guypuſcoa. It is called, by the Spaniſh miners, "*Hierro Elado,*" froſen iron, is found in a red clay, and produces natural ſteel, with this remarkable circumſtance, that it is not to be met with any where elſe in the kingdom. § They even preſerve

§ Steel conſidered chemically, is nothing elſe than iron reduced by art to a particular ſtate, which occaſions ſome changes in its properties, but theſe properties are eſſentially the ſame as thoſe of iron; that is, iron and ſteel are not two different metals, but the ſame metal, in two different ſtates. Steel may be made by fuſion or cementation: the firſt method is uſed to convert iron into ſteel, immediately from the ore, but more frequently from crude, or caſt iron; but all ores of iron are not uſed indifferently, for this purpoſe, becauſe ſome of theſe, which are therefore called *ores of ſteel*, are much fitter than others, to furniſh good ſteel, and the ſteel extracted from them is called *natural ſteel*. Dictionary of chemiſtry, London, 1777.

preſerve to this day, a traditional ſtory that this ore was uſed for thoſe famous ſwords, which Catherine of Aragon, made a preſent of, to her conſort, our Henry the VIIIth; ſome of which ſtill remain in repute in the highlands of Scotland, being ſuitable to their dreſs, and are called *Andre Ferrara*, the name of the maker, which is marked on the blades. The famous Toledo blades, thoſe alſo of Zarragoſſa, called *Del Perrillo*, mentioned in Don Quixote,* and others, were alſo ſuppoſed to be made of the ore of this mine, which gives forty per cent. metal, though rather difficult to fuſe: good ſteel may be obtained from it with very little trouble, becauſe the iron has in itſelf the proper diſpoſition

* Theſe ſwords were called *Del Perrillo*, from the figure of a little dog on the blade; Cervantes endeavours to heighten the courage of Don Quixote, when he attacked the lion in the cage, by adding, "That his ſword was of the common ſort, and not ſo ſharp as thoſe famous ones, with the Perrillo mark." *Tu magnanimo! con ſola una Eſpada, y no de las del Perrillo cortadorus.* Don Quixote, part II. cap. 70. Madrid, 1771. The Zarragoſſa artiſts had three diſtinct marks on their blades; viz. *El Perrillo*, a little dog; *El Morillo*, a Moor's head; and *La Loba*, a wolf. Swords with the *Loba* mark, have the name of Andre Ferrara on them, and are not uncommon, at this day, in England. They ſhew a ſword in the ſmall armoury of the tower of London, with the name of Andre Ferrara, and no other mark, which was taken in the Scotch Rebellion in 1715.

diſpoſition to receive in the forge, the neceſſary phlogiſton to make excellent blades, but without cementation it perhaps may not anſwer for files, or razors. Theſe blades were generally broad, to wear on horſeback, and of great length, ſuitable to the old Spaniſh dreſs, but this being altered at the beginning of this century, when the duke of Anjou aſcended the throne of Spain, the French ſwords were introduced with their dreſs, which even now is commonly called in Spaniſh, a military dreſs, *veſtido de militar*, in oppoſition to the long black cloak univerſally worn there before that epocha. So that the old Toledo blades fell into diſuſe, and the manufacture declined; but his preſent majeſty has again encouraged it, and a new manufacture has been lately ſet up, by his orders, at Toledo, for the uſe of the troops, and they are ſaid to be as well tempered as the old ones, and are able to bear moſt extraordinary proofs; but theſe are not made of the ore of Mondragon. There are various opinions relating to the old blades, we have been ſpeaking of; ſome ſay, they were only tempered in winter, and when taken out of the forge, for the laſt time, were vibrated in the air, in the coldeſt weather; others relate, that they were heated till they acquired that colour, the Spaniſh artiſts call cherry, and then, were ſteeped in a tub of oil, or greaſe, for a moment or two, then plunged, in the ſame manner, in warm water, all

which

which was done in the depth of winter: others will have it, they were made of the natural ſteel of Mondragon, with a liſt of common iron in the middle, to make them more flexible, and then tempered in the common way, in the winter ſeaſon. Such are the prevailing opinions about the blades of Mondragon, which are certainly excellent; but as to the preſent workmen of Mondragon, or in any part of Guypuſcoa, they are yet unacquainted with the ſecret of converting iron into ſteel, or tempering it properly, and even in the making of tools, are far inferior to the artiſts in England: it is ſomewhat particular, that to this very day, they have no other word in the Spaniſh language, for a bickhorn, or a bench vice, than *Vigornia*, the Latin name for the city of Worceſter, thought to have been once famous for works of that kind.* As many of the moſt capital workmen of Toledo, quitted that city, on the decline of their trade, and ſettled in different parts of the kingdom, where they ſupported the reputation of their art; and as their blades have ſince been diſperſed all over Europe, thoſe who are curious in theſe matters, will, perhaps, not be diſpleaſed to ſee a liſt of their names; as by this means they may know them, whenever they fall in their way.

* Teſoro de la lengua Caſtellana per el licenciado Don Sebaſtian de Cobarruvias Oroſco. Madrid, 1611.

Bilboa	Pedro de Lagaretea
Orgaz	Pedro Lopez
Liſbon	Melchior Saanz
	Juan Martinez Machacha
Seville	Sebaſtian Hernandez
	Pedro de Lezama
	Juan Martinez el Mozo
Madrid	Franciſco Alcocer
	Dioniſio Corrientes
	Antonio Ruiz
Cuença	Julian Garcia
	Andres Herraez
Valladolid	Juan Salcedo
Calatayud	Luis de Nieva
	Andres Muneſter
Cordoba	Alonſo Rios
Zaragoſſa	Julian de Rey
San Clemente	Lopez Aguado
Cuellar,	Bartholome de Nieva
and	Calcado
Badajoz	Campanero

The following workmen ſtill remained in Toledo.

Zamorano
Thomas de Ayala
Juan de la Horta
Franciſco Ruiz, and ſons
Juan de Vargas
Juan de Luizalde

Franciſco

Franciſco Lardi
Andres Garcia
Heras, father, ſon, & grandſon
Alonſo de Sahagun and ſons
Fernandez
Martinez

Any old blades found with theſe laſt names, may be undoubtedly conſidered as true Toledos, and executed by the moſt capital artiſts. Cervantes further relates that Ramon de Hoces was famous at Seville for making of poinards. *Debia der ſer el tal punal de Ramon de Hoces el Sevillano.* † Nor ſhould I forget the famous *Montante* of Spain,‡ a huge weapon, uſed with both hands at once, ſo well

† Don Quixote, tom 3. page 298. Madrid, 1771.

‡ Cobarruvias gives to the word Montante, an Italian derivation, " Montante, eſpada de dos manos, arma de ventaja y conocida, de *Montar* palabra Italiana que quiere decir, ſubir, o porque el montante excede la eſtatura del hombre o porque ſe juege por lo alto.—Teſoro de la lengua Caſtellana, por Don Sebaſtian de Cobarruvias. Madrid, 1611. This curious book may be truly ſaid to be a treaſure, according to its title, for thoſe that ſtudy the Spaniſh language, and are deſirous of underſtanding the true ſpirit and ſenſe of its moſt difficult words, though the witty Queyedo paſſes rather a ſevere cenſure on it, in his novel intitled, *Cuento de Cuentos*, adding," Tambien ſe ha hecho teſoro de la lengua Eſpanola donde el papel os mas que la razon, obra grande, y de erudicion deſalinada.

well deſcribed by Milton, ſpeaking of Michael's ſword:

" With huge two-handed ſway
" Brandiſh'd aloft, the horrid edge came down,
" Wide waſting." PARAD. LOST, Book vi.

In the king's armoury at Madrid, beſides many curious and complete ſuits of armour, they have a fine collection of antique ſwords, amongſt the reſt, they ſhew thoſe, ſaid to have belonged to Pelagius, to the Cid, and Bernardo del Carpio; alſo the ſword of king Francis 1ſt, and that of John George, duke of Saxe-Weimar, taken from him by Charles 5th, at the battle of Horlingen. The ſwords of the Cid, and Bernardo del Carpio, were made at Zaragoſſa, but that of Francis, at Valencia, as was alſo the ſword, likewiſe in this armoury, of that famous hero Garcia de Paredes, with his name on the blade, and on the other ſide " plus ultra operibus credite." Though theſe details may perhaps be conſidered of very little moment, it was not ſo with our anceſtors, who ſet a high value on theſe Spaniſh blades, particularly the Toledos, as may be collected from various paſſages in our favourite writers, Shakeſpear, Johnſon, and Butler.

LETTER

LETTER XIV.

Environs of Reinoſa, ſource of the river Ebro, and intended canal of Caſtile.

THAT part of Spain called "Montana de Burgos," may be thrown into two grand diviſions. The firſt takes in all that ſpace from the higheſt part of the mountains, to the Bay of Biſcay, and the other, the ſpace extending from the ſame height towards Caſtile. The higheſt part of theſe mountains, is that intermediate ſituation between Santander, and Burgos, it being a continual aſcent of fourteen leagues from Santander to Reinoſa, deſcending afterwards from thence, as far as Burgos. The ſource of the Ebro is within half a mile of Reinoſa, and runs eaſterly, till it falls into the Mediterranean, while the Piſuerga runs into the Duero, whoſe courſe is weſterly, and empties itſelf into the ocean; from whence it may be inferred, that Reinoſa divides the waters between the two ſeas, and is therefore one of the moſt elevated diſtricts in Spain, as well as the coldeſt, its lofty mountains raiſing their heads as high as the line of congelation, being conſtantly covered with ſnow. The ſoil of Reinoſa produces the beſt oaks in

in the kingdom, equal to any in Europe, and ſome thouſands of them, are occaſionally felled for the ſervice of the navy. Good oaks will not ſucceed ſo well in a rich limy ſoil, abounding with moiſture, but require on the contrary, that it ſhould be of an argillaceous nature, ſtiff and compact, as well as dry, where they ſuffer no injury from dampneſs, and thrive by ſlow and proper gradations. The ſoil of Reinoſa is in general, compoſed of ſandy rock, mixed with quartz, as large as cheſnuts, cemented in the rock in the ſame manner as in the warm climate of Granada. About a league to the north of Reinoſa there is a very high mountain called Arandillo, whoſe ſummit is at preſent ſo much decompoſed, as to form an extenſive plain where there is very good graſs. The people of the country, ſay there was formerly a town here, and the quantities of looſe ſtones ſtill remaining, ſeem to confirm the report. The nature of this mountain is ſingular, its baſis being of gypſeous ſtone, its ſummit of ſand ſtone, and its centre of limeſtone, with large impreſſions of cornu ammonis, and ſeveral ſcallop ſhells fixed in the rock. On the road to Reinoſa, black marble veined with white is ſeen in great quantities; the ſame may be obſerved at the *Puerto* between Aſpeitia, and Vidana, where there is a mountain of ſimilar marble, from top to bottom. Two leagues to the ſouthward of Reinoſa, there is another high mountain,

mountain, with an hermitage at the top, where there is great plenty of bilberry whortle, the vaccinium of Linnæus; * and to the weſtward, there is a height where great numbers of Roman coins have been dug out, which indicates its having been formerly a Roman colony: near this place ſeveral large lumps of emery are ſeen above ground, fixed in the ſand ſtone. †

The famous river Ebro, which once ſerved as a boundary between the Carthaginians and Romans, has its ſource in a little valley at a ſmall diſtance to the eaſtward of Reinoſa, and proceeds from a copious ſpring at the foot of an ancient tower, called *Fontibre*; at a few paces from hence, its waters turn a mill, and abound in excellent trout, and plenty of cray fiſh; in paſſing by Reinoſa, it is encreaſed by the waters of ſeveral other brooks, and ſprings; two leagues lower, it runs by the narrow paſs of Monteſclaros, receives different ſupplies in the courſe of its paſſage through the vallies, is conſiderable when it comes to the confines of Alava, and after traverſing many open and fertile diſtricts, paſſes by the city of Tortoſa, where there is a bridge of boats over it, and then falls into the Mediterranean at the Alfaque

* Vitis idea of Gerard and Ray.

† A more particular account of emery will be given in the ſecond part of this work.

faque iſlands, but on account of its many rocks and ſhoals, is not navigable higher than Tortoſa, and even ſo far, only for ſmall craft.

There is a ſmall briny lake near the ſource of the Ebro, where they might obtain ſalt, as is done near the ſource of the Tagus, in the ſame manner as in Guypuſcoa already mentioned. In winter this lake is covered with wild ducks, and other aquatic fowl; the country is well provided with game, they have partridges and quails in abundance, as well as hares, and in the mountains there are bears. The meadows are covered with uſual plants, ſuch as round birthwort, ſquinancy berries, yellow-weed, parſley leaved vervain, privet, and cockſcomb; but of the aromatic ſorts, none but pennyroyal. Beech trees are common hereabouts, bearing the maſt, which is a kind of a triangular ſeed in form of a nut, or rather an acorn, containing a whitiſh oleaginous pith, of an agreeable taſte, but the inhabitants are ignorant of the method of drawing oil from this fruit, as in France: they gather it in the ſame manner as they do acorns, in Eſtremadura, getting up into the trees and ſtriking them with poles, and uſe it to fatten the ſwine. When put under the preſs and formed into cakes, it makes an excellent fodder for cows, on being mixed with water, and is of great ſervice when they cannot go into the fields on account of the ſnow.

ſnow.* The intended canal of Caſtile, is to begin at the village of Olea, near Fontibre, about a league and a half from Reinoſa, is to paſs by Comeſa, Cabria, Villaeſcuſa, Eſtrecho del Congoſto, Mave, Villelſa, Eſtrecho de Nogales, Herrera de Piſuerga, Oſorno, Fromiſta, Convento de Calahorra, and Grijota; where it is to meet the branch of Campos, that is to come from Medina de Rio Seco, then to continue by Palencia, Duenas, Venta de Trigueros, and La Veruela, and enter the river Piſuerga, below Valladolid; by which means, it will communicate with the Duero, and meet another branch, which is to begin at Segovia, and paſs by Hontenares, Bernaldos, Nava de Cocos, Olmedo, Mata-pozuelos, and Villanueva de Duero; but when all this will be executed, thoſe who have travelled through Spain, and obſerved the ſlow progreſs of all public works, may form a tolerable judgment,

* An attempt was made ſome years ago to introduce the extraction of beech oil in England, and a patent was granted for that purpoſe, but it did not ſucceed, the country people chooſing to keep their maſt to fatten their ſwine, rather than ſell it to anſwer the purpoſes and private views of any individual.—Rolt's dict. of commerce. London, 1761. —The nuts, when eaten, occaſion giddineſs, but when well dried, and powdered, they make wholeſome bread. They are ſometimes roaſted and ſubſtituted for coffee. The poor people in Sileſia uſe the expreſſed oil, inſtead of butter.—Dr. Withering's botanical arrangement, &c.

judgment, ſo that this grand improvement with many other projects, of a leſs ſolid foundation, may be ſaid to be yet cloſely enveloped, and hidden in the boſom of time.

LETTER XV.

Natural Hiſtory of the Spaniſh plant Gayuba, *or perennial leaved ſtrawberry-tree.*

THE Spaniſh plant gayuba, having been deſcribed by the late Don Joſeph Quer, ſurgeon to his Catholic majeſty, and firſt profeſſor of betany in the royal garden at Madrid, I ſhall lay before my readers a ſummary of his treatiſe, * with the obſervations which occured to him in the courſe of his practice, reſpecting this plant.

The gayuba, or arbutus uva urſi, of Linnæus, § is indigenous to Spain, for though it grows in Italy and other ſouthern climates, it is found in none ſo common as in that kingdom. Don Joſeph Quer diſcovered it near the Eſcurial, and on the

* Diſſertacion phyſico botanica ſobre la paſſion nephritica, y ſu verdadero eſpecifico, la uva urſi, o *Gayubas*. Su autor Don Joſeph Quer Cirujano de S. M. Conſultor de ſus reales exercitos, academico del inſtituto de Bolonia, de la real medica matritenſe y primer profeſſor de botanica del real jardin de plantas de Madrid. 1763.

§ Uva urſi. Clus hiſt. 63. Hiſpanic 79, & Tournefort inſt. R. H. 599. Claſs xx.

Tabern

the hills of Buytreras, on the mountains of Manzaneres, in different parts of the Alcarria, * ſuch as the diſtrict of Lupiana, mountains of Buen Dia, Albalete de Zorita, Fuente Novilla, and other places: it is particularly common near all the villages, and lands, belonging to the extenſive Serrania of Cuenca, all the ſtony mountains of the lordſhip of Molina, and near the ſource of the Tagus. In Aragon, on the mountains of Daroca, *Puertos* of Atea, and Acere on the mountains of Burgos, and Leon, and county of Niebla, and Carrera de Leon, from Contorno de Villalmanſo, to Cogollos; and from Manciles, to Villadiego, as you go from Burgos to Cervera, in ſo copious a manner, that the place is called *Gayubal:* alſo on

Tabern Icon 1080. Boerhaave Ind. A. 11. 219. Scheuchz Itin vii. 520.

Vitis Idæa foliis carnoſis, et veluti punctatis, ſive Idæa Radix Dioſcoridis, C. B. Pin. 470. Raii hiſt. 11. 1489.

Radix Idæa putata et uva urſi I. B. i. 523. Idæa Radix Lugd. 193.

Uva urſi Galeni Cluſio. Park, 1458.

Vaccinia urſi, ſive uva urſi apud Dluſium Ger. 1230. Emac 1416.

Arctoſtaphylon. Siegeſb. flor. 13.

Arbutus caulibus procumbentibus, foliis integerrimis. LINN. H. cliff. 163.

Officin. Vitis Idæa.

In Spaniſh *Gayuba.*

* A populous diſtrict is ſo called, when conſiſting of villages, farms, and rural improvements.

on the ſkirts of the Pyrenees of Catalonia, in Biſcay, and Navarre, and in the kingdoms of Granada and Valencia; inſomuch that the beforementioned profeſſor adds, that he does not recollect ever to have gone upon a botanical party, without ſeeing it. It is ſo univerſally known in Spain, that it has its particular names in almoſt every province, as for example:

In Caſtile, Alcarria, and lordſhip of Biſcay, - -	*Gayubas*
In Leon, - - -	*Agauja*
In Bureba, - - -	*Gaulla*
In Rioja, - - -	*Avuguas*
In Aſturias, the fruit is called -	*Rebellones*
In Albalate de Zoritæ, - -	*Aguavillas*
In the villages of the Alcarria, indifferently, -	*Gayuberas*, *Gaubillas*
In Utiel, Partido de Requena, -	*Galluva*
In Real de Manzanares, -	*Uba dus*
In Catalonia - - -	*Buxarolla*

The great variety of theſe names ſhew, how univerſal it is all over the kingdom, and proves what little dependance is to be had on the relations of travellers, who only ſee the high roads, and never deviate from them, to inſpect into remote places: even Cluſius, the moſt intelligent, and curious of thoſe writers, tells us, he only ſaw it at the Venta del Baul, when it can be made appear, that

that in all thoſe parts of Spain, which he traverſed, it grows in great quantities; and were all the uncultivated places to be mentioned, where the Gayuba is found, particularly, ſuch as are called *Rubiales*, it would form a liſt of almoſt all the ſtony and uncultivated places in the kingdom. It is perennial and an evergreen, flowers in March, and April, and the berries are ripe in September, and October. The leaves are narrow, rounded at the extremity, and contain only one fibre. The berry is as large as the kernel of a hazle nut. Its ſingular mode of multiplication is curious, proceeding from the old branches, which trailing on the ground and gently riſing, throw out new roots, which maintain its brothers, though the fire ſhould be cut off, or decay; it is pleaſing to obſerve a ſhoot of two or three plants adorned with ſtems and branches, with others iſſuing from them, ſo that one plant occupies a great ſpace of ground, covered with its green foliage and red berries; but what makes this plant more worthy of attention, is its excellent qualities in calculous caſes, being in a manner an *unique* in thoſe caſes, where every other ſpecific has its contraindication, while this admits of no kind of danger, nor has ever been complained of by thoſe who have written concerning it; and none of thoſe who uſed it by the advice of Don Joſeph Quer, and acknowledge themſelves to be perfectly cured, have ever com-

complained of the leaſt inconvenience, though ſome were not wanting, who remarked its effects with the greateſt exactneſs; ſuſpecting, that its ſingular efficacy in the cure of the ſtone, might perhaps hide other obnoxious qualities, which however the moſt accurate ſcrutiny has not been able to diſcover.

The method generally uſed, ſays profeſſor Quer, in adminiſtering this ſimple remedy, is to give the powder of the leaves only, or a decoction in water. Foreigners frequently uſe the firſt method, and I have chiefly followed the latter, though I have obſerved the like good effects from both. When the berry is perfectly ripe, which is upon its acquiring a red colour like coral, it is given in powders from ten grains to a ſcruple, or half a dram, and from half a dram to one or two drams. The root when in decoction, according to Chriſtian Hermann, from half a dram to two drams: the ſame with the leaves, or in an infuſion, and about a handful, or handful and a half of the leaves or more, and in powder from half a ſcruple to a dram; but according to my conſtant practice, I have fixed the doſe to two drams of leaves in a pound of water, and when in powders, I always give a dram, becauſe a leſs quantity only excites pain, and does not come up to the deſired effect. It ſhould be uſed, three or four times a day in the paroxyſm, taking a copious draught of the

the decoction, and if it ſeems more palatable to a delicate ſtomach to ſweeten it with ſugar, it may be done, but muſt be continued for weeks and months. When the pains have ceaſed, one doſe given daily two hours before breakfaſt will be ſufficient, obſerving the uſual diet, in which caſe it may alſo be eſteemed an excellent preſervative, without being repugnant to thoſe few convivial hours which may fall to the lot of the wiſeſt of men.

It appeara to be particularly uſeful in ſcorbutic caſes, from the teſtimony of two learned writers of the faculty, Marcus Mappi, and J. Chriſtian Hermannn, in the *hiſtoria plant. Alſat.* written by the former, and after his deceaſe publiſhed by the latter, where it is ſaid, "Baccæ maturæ hyemis tempore aceſcunt; valde gratum habent ſaporem, ſub nive vigent et conſervantur diu, in locis ſeptentrionalibus, maxima copia creſcunt, et cum alis ibidem creſcentibus, adæquatum et ſufficiens remedium ſcorbuti præbent, annotante id etiam Joanne Frid. Bachſtrom, qui etiam horum myrtillorum rubrorum ingentem vim in iſtis locis provenire confirmat, provido omnis neceſſitatis humanæ numinis beneficio."—Pag. 331.

In the year 1734, after the conqueſt of Naples, continues Don Joſeph Quer, I returned to the court of Madrid, and practiſed in my profeſſion, and

and preſcribed the gayuba, whoſe virtues were unknown, though in many provinces, they were well acquainted with the name of the plant. In 1762, I gathered it at Fuente Novilla, to have it delienated; in many places, the country people were ſurpriſed to ſee me take notice of it, when according to their notions it was ſo pernicious to children, who eat of its berries. I preſcribed it to a patient, ordering him to boil two drams of the leaves, in a large veſſel of water, which had the happieſt effect. By this means I introduced the uſe of it at court, and believe I was the firſt in Spain who adminiſtered it. In further proof of its efficacy, I ſhall add, that the illuſtrious Senor Lupia biſhop of Leon, having applied in ſeveral places, as well abroad as in Spain, for a remedy for a nephritic complaint, they ſent him a plant from Rome, with the name of *Buxarola*, whoſe virtues, as well as name, were totally unknown to us, yet the vegetable exiſts in great quanties, and is known in the kingdom of Leon by the name of Agauja.

In the year 1740, being at Barcelona, I went on a botanical party, to viſit the famous mountain of Montſerrate, in company with that celebrated botaniſt Don Juan Minuart, profeſſor of botany of the royal garden, and we ſpent two and twenty days in that excurſion; my friend was much troubled with nephritic complaints, which were extremely

tremely painful, particularly at that moment when we were at the very ſummit of the mountain, from whence he found the utmoſt difficulty to deſcend; luckily we met the gayuba on that very ſpot, and when he had reached the convent, he had the moſt violent ſymptoms of his complaint, therefore I immediately ordered the following decoction:

R. Gayuba leaves	-	2 drams
Camomile flowers	-	½ dram
Refined nitre	-	1 ſcruple.

In a proper veſſel, boiled in a pound of water, and left to ſimmer, over a ſlow fire, the veſſel kept covered, and when removed, not to be ſhaken; the above to be drank lukewarm, adding half an ounce of refined ſugar, and to be taken twice a day; that is, in the morning early, faſting, and in the evening, by which method the fits ceaſed, and the patient continued it, during the courſe of our tour, with the moſt happy effects, having been enabled to complete his reſearches with comfort and eaſe.

Thus far our author, who enters into many details, relating to nephritic complaints, and their method of cure, amongſt the ancients and moderns, addingal ſo the practice of Dr. de Haen, of Vienna, with reſpect to this plant; but as it is ſo well

well known to our phyſicians in England,* I have only made uſe of the hiſtorical part of his narrative, paſſing over ſome trifling reflections on the ſyſtem of Linnæus, with which he did not ſeem to be perfectly acquainted; we ſhall therefore the leſs regret his Spaniſh Flora, which he had begun, but only lived to finiſh the letters A, B, and C; and from ſo injudicious a method of treating this ſcience, his more enlightened ſucceſſors will probably never be tempted to continue it.

LETTER

* "Arbutus uva urſi, the perennial leaved ſtrawberry-tree, the ſtems trailing leaves very entire, cup purple, bloſſoms white. In the Highlands of Scotland, and in Wales, upon the mountains. The berries are inſipid, pulpy, and mealy. The plant is much uſed in Sweden to dye an aſh colour, and to tan leather. Half a dram of the powdered leaves, given every, or every other day, hath been found uſeful in calculous caſes. It was firſt uſed for this purpoſe at Montpelier, and afterwards Dr. de Haen, at Vienna, relates ſeveral caſes in which it proved of the greateſt ſervice; its ſucceſs in England has been uncertain, ſometimes the patients found no relief, but thought their complaints rather aggravated, than alleviated; whilſt in other calculous aud nephritic caſes, the ſymptoms have been almoſt entirely removed. Perhaps, upon the whole, we ſhall find it no better than other vegetable aſtringents, ſome of which have long been uſed by the country people, in gravelly complaints, and with very great advantage, though hitherto unnoticed by the regular practitioners"——Botanical arrangement of all the vegetables growing in Great Britain, &c. by William Withering, M. D. Birmingham, 1776.

LETTER XVI.

Deſcription of the lordſhip of Biſcay, and its products.

THE lordſhip of Biſcay is a mountainous country, about twelve leagues in length, from eaſt to weſt, and eight from north to ſouth, conſiſting entirely of hills, and mountains, of various dimenſions, moſt of which are cultivated to the very ſummit, the vallies being checquered as well as the hills, with villages, farms, arable land, and paſture; the whole with ſuch infinite variety and beauty, as to form a delightful landſcape, with the moſt pleaſing and romantic aſpects the mind can conceive: the ſurface of earth generally lies over maſſes of ſtone, or detached rocks, limeſtone, ſandy or grit ſtones, and ſometimes valuable marble of various colours, particularly that dark grey inclining to black, ſtreaked with white. The pillars in the king's chapel at Madrid, are of this ſort, and come from Manaria; at other times, the ſurface extends over iron mines, though that of Somorroſtro is the moſt conſiderable, and employs the greateſt number of forges.

Many of theſe mountains, conſiſt of hills piled up upon each other, like that of Gorveya, which

takes five hours to aſcend; its ſummit affords a beautiful plain, with abundance of paſture, where the herds of Biſcay, and Alaba remain for ſome months. Amongſt other plants, it produces the *Ribes*, or black currant, whoſe leaves have a flavour of pepper, and are reckoned uſeful in gouty complaints. Near Durango the hills are bare, and from their ſteepneſs, very difficult to aſcend. *Serantes*, near Portugalete, is another high hill, in the form of a pyramid, and being ſeen at a great diſtance, is a good land mark for mariners, ſailing into the river of Bilbao: from its ſhape it ſeems as if it had been a volcano; many have erroneouſly taken it, for the mine of Somorroſtro, but this is at a league diſtance. There are other mountains of half a league or a league in length, with craggy peaks, whoſe ſides nevertheleſs admit of cultivation, and dwellings, ſuch as that of *Villaro*; others are low and flat topped, covered with earth, having farms and habitations, beſides wood for charcoal, and even meadows for paſture, extending to their ſummit, but none yield products in proportion to their ſurface: for the vegetative ſyſtem riſing in a perpendicular line, an oblique ſuperficies cannot ſupport more trees or plants than a plain of equal baſis; as on a triangle one cannot raiſe more perpendiculars, than ſuch as fall on its immediate baſis.

Small

Small rivers and brooks iſſue from the crevices and clefts of theſe mountains; from Gorveya there run four, which uniting with that from the great mountain of Orduna, added to other torrents burſting through gullies where there is no water in ſummer, ſerve to form the river of Bilbao: theſe are ſo tremendous in winter, when ſwelled by heavy rains, as even to threaten the town with deſtruction, if they unfortunately met the tide at high water; the inhabitants are often alarmed in this this manner, and it is common with them to go about the ſtreets in boats at this ſeaſon of the year.

If we except the ploughed fields, and the bare tops of ſome jagged mountains, all the reſt are covered with woods, either for timber, or charcoal; ſome are natural, ſuch as the holm, and arbutus, others are ſowed, or planted, particularly oaks, which grow very faſt. Where there are no woods, and a good depth of ſoil, it produces impenetrable thickets of the ſhrub called *Argoma*, as well as Cantabrian heath, * and fine gorze. Higher up, where there is leſs earth, the ſides of the hills, and the vallies, have plenty of grafted cheſnuts, which the Hamburgh ſhips carry away in great quantities from Bilbao. The apple tree ſeems here to be in its natural ſoil, and thrives admirably without cultivation;

* Erica cantabrica flore maximo foliis myrti, ſubtus incanis. Ray's Sym. 472.—Andromeda Daboœcia. Linn.

tivation; the whole country produces varieties of this fruit, but thoſe of Durango are the beſt. Renets are common of two or three ſorts; cherry trees grow as high as elms, at *Gordejuela*. They have excellent peaches, which they call *pavias*, with this remarkable circumſtance, that they are never grafted, or improved by any particular culture. † Thoſe of Aranjuez are of this kind, but have not their flavour nor mellowneſs. Of pears they have great variety, and alſo thoſe choice ſorts, as the beuerre, fondante, doyenne, and bergamotte; beſides abundance of figs, nuts, and currants; and though the country does not produce raſpberries naturally, it abounds with excellent ſtrawberries, as well as all manner of garden plants, greens, and pulſe in perfection. Their onions are remarkably ſweet; Galicia furniſhes them with turneps for cattle, and they have the ſmall ones for the kitchen; their cows and oxen are ſmall, but ſtout and robuſt: goats they had better be without, as great care muſt be taken to prevent them from deſtroying the trees: ſheep they have none, and indeed it would be a difficult matter

† The French diſtinguiſh peaches into two ſorts, viz. pavies and peaches. Thoſe are called peaches which quit the ſtone, and thoſe whoſe fleſh adheres cloſely to the ſtone, pavies, which are more eſteemed in France than the peaches, though in England the latter are preferred by many. —Miller.

matter to hinder them from continually entangling themſelves amongſt the thickets. They have ſix or ſeven ſorts of grapes, of which they make the *Chacoli* wine; all ſpots are not equally favourable; however the vineyards are numerous about Orduna and Bilbao, and form the principal revenues of the country gentlemen; but as the prices are fixed, and no foreign wine can be introduced nor ſold by the publicans, while their own vintage is ſelling, they are more eager to increaſe the quantity, than meliorate its quality, for which reaſon it is in general bad; beſides, they make their vintage too early, which gives a ſharpneſs to the wine, and deprives it of body; and being unſkilful as well as careleſs, mixing the rotten and ſour grape with the reſt, Chacoli is a very poor wine. Their whole vintage will not ſuffice for four months conſumption, and the deficiency muſt be made up from the province of Rioja, which occaſions a ſaying, "That all the iron of Biſcay is ſwallowed down in foreign wine, by the natives." Even Engliſhmen and Germans, are people of great ſobriety, compared with many Biſcayners, yet drunken men are ſeldom ſeen in the ſtreets, becauſe they are accuſtomed to eat heartily in theſe drinking entertainments; both men and women breakfaſt, dine, eat in the evening, and ſup very plentifully; and yet enjoy excellent health.

Moſt

Moſt of the mountains of Biſcay, and Guypuſcoa, are of an argillaceous ſubſtance, the ſtone decompoſes very little, or reſolves into earth, though calcareous ſtone is abundant, and in many parts they have manured for ages paſt with lime, yet it has cauſed very little alteration; the argillaceous ſubſtance ſeems to abſorb the calcareous, mixed with it, for though lime is the beſt ingredient to looſen the argillaceous particles which cling to the roots of delicate plants, and hinder them from penetrating further, and alſo to correct the acid, and convert it into more tractable land, yet thoſe of Biſcay ſtill preſerve their tenacity; that were it not for extraordinary labour, they would only produce thickets of bruſh wood, and briars: to prevent which, they turn up the earth with iron prongs, which inſtrument they call *laya*. Three or four labourers unite together, for one alone would make no progreſs; by this means they ſeparate large pieces of turf, which are turned upſide down; then another perſon comes, and in the trench which they have made, cuts away the weeds and roots, and the turf is next broke with the ſpade, and the winter froſt detaches it ſtill more. This operation is termed *Layar*.

In ſpring they draw a harrow over it with oxen, then ſeparate it ſtill more with another harrow; if all this will not do, they beat it with wooden mallets; then with a ſpade they dig holes in ſtraight

ſtraight lines, at two feet diſtance from each other. In every one of theſe, they ſow three or four grains of maiz, a few ſeeds of pumpion, ſome kidney beans, and peas, then filling the hole with manure, they cover it over with earth.

Between September and October the ears of maiz are ripe, and they cut the plant cloſe to the ground, leaving the root to ſerve as manure. The cattle eat the leaves; and the ſtalks being trod under foot, ſerve likewiſe for manure. After the corn is ſowed, they ſlightly turn the earth, during the winter, with a long and narrow ſpade, to break it more effectually, and looſen the ſtrong ſubſtance; this they call *ſallar*. In May or June they do the ſame once more, to deſtroy the weeds, which would otherwiſe ſtifle the grain. Their harveſt time is in Auguſt, and they leave the ſtubble till winter, for paſture, when they again renew the work of the laya. This may be done continually with land contiguous to a farm, which partakes of its manure, or has lime thrown over it; but the lighter ſoil is generally left fallow a twelve month; ſome ſoils are ſo ſoft and flexible, as not to require a ſtronger plough than is uſed in Caſtile; but in ſuch they only ſow wheat, and as tractable land is ſcarce, they break up the ſides of the mountains, which, having little depth, will not bear large trees, and are generally covered with furze; for this purpoſe they incloſe, with a hedge,

hedge, the ground to be broke up, turn up the earth with a ſpade, cutting turf four inches deep, entangled with weeds and roots; after theſe roots are thoroughly dried, in July or Auguſt, they pile the turf in the form of a pyramid, ſetting fire to the whole, and covering it with earth to prevent inflammation, ſo that the earth may be burned in the ſame manner as charcoal. They ſpread out this burned turf, which acquires the colour of brick-duſt, then till the land and ſow their corn; the three firſt years they have a plentiful harveſt of wheat, the fourth they ſow barley, and the fifth flax; then the land begins to wear out, the hedge is taken down, and it affords tolerable paſture till its ſurface gets covered with brambles and weeds. All this hard labour is neceſſary to oblige this ſtubborn ſoil to maintain ſuch numbers of people, who like to live well, and ſtand in need of good food, to ſupport ſuch conſtant fatigue; even all this will not do, they are ſtill forced to get corn from Caſtile, or elſewhere, but they always prefer that of Caſtile, as better though dearer. In the ſame manner they depend on their neighbours for other kinds of food, as in ſo cloſe a country, covered with woods, little is left for grazing; nevertheleſs they eat better meat than their neighbours, as their cattle are ſtall fed in the winter.

Game would be plentiful if there were not ſo many ſportſmen, though they do not want for partridges,

partridges, and their quail are the beſt in all Spain. In marſhy places, they are well ſtocked with wild ducks, woodcocks, and ſnipes. In the plains they have hares, but no rabbets, nor any deer, nor roebucks, which laſt the Spaniards call *corzo*, as coming originally from Corſica; as they give the name of *galgo* to a greyhound, having firſt had them from Gaul, as Martial ſays,

"Leporemque læſum Gallici canis dente."

Lib. iii. Epig. 47.

The woods are not without wild boars; and Don Manuel de las Caſas who had been miniſter of Marine at St. Sebaſtians, killed a very large lynx, (lupus cervarius) in that part called *las encartaciones*;* but the common wolf is ſcarce, there being ſo few ſheep to entice them, and the country ſo fully inhabited by which means they are immediately diſcovered and killed. Hardly once in an hundred years one meets with a bear, though ſo common in the mountains of Leon and Aſturias, which form a chain jointly with thoſe of Biſcay; but they have plenty of foxes, to the great annoyance of their houſewives, from the havock they make amongſt the poultry. Their ſea-ports are well ſupplied with fiſh, every ſort being better and

* The name of Encartaciones is given to a certain number of villages in the mountains of Burgos near Biſcay, where they enjoy the ſame franchiſes and privileges as the people of that lordſhip.

and firmer in the ocean than in the Mediterranean, ſo that without having a very nice palate, it is eaſy to diſtinguiſh a bream of Biſcay from one of Valencia. Oyſters and other teſtaceous fiſh they have likewiſe in great plenty, and that delicate fiſh called *Sardina*, in ſuch numbers, that you may buy a hundred for the value of a halfpenny.

LETTER XVII.

Reflections on the genius and character of the Biſcayners.

THE Biſcayners give the name of republicks to the different juriſdictions in their provinces, all which, except Orduna, their only city, and a few towns, are compoſed of hamlets, and lonely houſes, diſperſed up and down, according to the convenience of ſituation, in ſo cloſe and interſected a country. However their houſes have every advantage of diſtribution, conſiſting of a principal ſtory, beſides the ground floor, for offices, with an appendage of ſtables, granaries, out-houſes, courts, cellars, and gardens; with orchards, meadows, and often corn-fields, contiguous to the building, with cheſnut groves, and other improvements to the very foot of the mountains. Nothing can be more pleaſant to the traveller, than to ſee houſes and gardens during the whole courſe of his progreſs,

greſs, particularly from Orduna to Bilbao, an extent of ſix leagues, which ſeems like one continued village. The upper part of the houſes were formerly of wood, but the new ones are of ſtone, and one ſeldom ſees an empty houſe, or any fallen in ruins; on the contrary, many new ones, both large and convenient, are conſtantly building; from whence it appears, that though population cannot well be conſiderably encreaſed, while new branches of induſtry are not introduced, all the land being occupied, it ſeems, rather to augment, notwithſtanding the many emigrations; and though ſome women emigrate likewiſe, few remain at home without huſbands. Theſe diſperſed families may be held as the moſt ancient in Spain, and the country is indebted to them, for population and culture. In the Biſcay language they are called *Echejaunas*; that is, lords of tenements, whoſe anceſtors have poſſeſſed them time immemorial, and will probably continue ſo for future ages, as ſelling or mortgaging is held in great diſrepute. Such lands as belong to rich families, are let out to others, and as they lie under their eye and inſpection, the whole is attended to, with the utmoſt activity; the parochial church ſtands in the centre of the pariſh, which, if too extenſive, has a chapel of eaſe, for the conveniency of the pariſhioners; many of whom repair to theſe churches from very great

great diſtances, in the ſevereſt weather. Their antiquity may be traced from their dedications, which are generally to the Bleſſed Virgin, to St. John, or the apoſtles and ſaints of the Primitive Church; and their livings muſt be comfortable, from the decent appearance of their paſtors.

Not only Biſcay, Guypuſcoa, and Alaba, but alſo the mountains of Burgos, are full of gentlemens ſeats, known by the name of *Solares*, or *Caſas Solariegas* worthy of much veneration from their antiquity; the owners of theſe are diſtinguiſhed by the title of *Hidalgos de Caſa Solar*, or *de Solar Conocido* — "Gentlemen of known property;" the moſt honourable appellation in Spain. They are generally ſtrong, plain ſtructures, with ſquare towers; but many of the towers have been deſtroyed; and in the modern repairs, they have followed the faſhion of the times.

The head of the family is called *Pariente Mayor*, and is greatly reſpected by all the collateral branches; ſome of theſe are of ſuch high antiquity, as to be thought to have dwelled there before the eſtabliſhment of Chriſtianity, in that country, ſince their anceſtors were the founders of the churches, had the patronage of them, and were known ſo far back as four centuries ago, to have, even then, been time immemorial, in receipt of the tythes; others, without any patronage, are deemed

deemed equally ancient; many are ſo far reduced as to be obliged to cultivate their eſtates, with their own hands, yet will not yield to the others, in nobility and deſcent, alledging that, though ſome branches have been more enriched by fortunate events, yet they are all equally ſprung from one common anceſtor. Their names have undoubtedly paſſed in a lineal ſucceſſion, from a more ancient date than the ages of chivalry, the eſtabliſhment of coat armour, or of archives, and records; to which they pay little attention, as of no importance to illuſtrate their quality, the poſſeſſion of one of theſe houſes, or the conſtant tradition of being deſcended from a former poſſeſſor, being more than ſufficient to enoble their blood; many ſuch having ſhined in the annals of Spain, by the nobleſt deeds, which have immortalized their names more than their ancient deſcent. Theſe have ſettled in different parts of the kingdom, while the head of the family has continued at home, in a ſtate of ſimplicity, ploughing his fields, and inſpiring his children, with ſentiments ſuitable to the heroical ages: the daughters are brought up in a different manner from moſt other parts of the world; here the moſt opulent do not diſdain the management of houſhold affairs, and every branch of domeſtic œconomy, with a noble ſimplicity, that ſeems to recall thoſe glorious ages of which Homer has ſung. Whoever looks for innocence,

cence, health, and content, will find it amongſt the inhabitants of Biſcay; and if they are not the richeſt, they may be well deemed the happieſt of mankind. *

It is pleaſing to behold with what affability the rich demean themſelves towards thoſe who are leſs ſo than themſelves, being obliged to this condeſcenſion from the natural ſpirit, and pride of the people, added to their education and notions of freedom. Unaccuſtomed to brook the leaſt ſcorn, or to comply with that ſubmiſſive behaviour ſo uſual from the poor to the rich, in more refined and opulent kingdoms; yet the common proverb of Caſtile, *Pobreza no es vileza*, "Poverty is not a blemiſh," has no ſway here, for ſuch are their notions of labour, and induſtry, that their ſpirit makes them conſider it as an indignity to beg; and though the women are generally charitable, which cannot fail to attract mendicants, yet theſe are moſt commonly ſtrangers.

The country people wear brogues, not unlike thoſe of the highlands of Scotland, tied up with great neatneſs, being the moſt uſeful for a ſlippery and

* Mr. Bowles relates, that the moſt opulent families make no ſcruple to bake, brew, dreſs victuals, and waſh linen. For my part I cannot ſay I obſerved theſe circumſtances amongſt the opulent Biſcayners, though I often experienced their open-hearted hoſpitality and benevolence.

and mountainous country. When they are not buſy in the fields, they walk with a ſtaff taller than themſelves, which ſerves them to vault over gullies, and is an excellent weapon in caſe of aſſault, with which they will baffle the moſt dextrous ſwordſmen; they wear cloaks in the winter, the pipe is conſtantly in their mouth, as well for pleaſure as from a notion that tobacco preſerves them againſt the dampneſs of the air; all this, joined to their natural activity, ſprightlineſs, and vigour, gives them an appearance ſeeming to border on ferocity, were it not the reverſe of their manners, which are gentle and eaſy, when no motive is given to choler, which the leaſt ſpark kindles into violence.

It has been obſerved, that the inhabitants of mountains are ſtrongly attached to their country, which probably ariſes from the diviſion of lands, in which, generally ſpeaking, all have an intereſt. In this, the Biſcayners exceed all other ſtates, looking with fondneſs on their hills, as the moſt delightful ſcenes in the world, and their people as the moſt reſpectable, deſcended from the *aborigines* of Spain. This prepoſſeſſion excites them to the moſt extraordinary labour, and to execute things far beyond what could be expected, in ſo ſmall and rugged a country, where they have few branches of commerce: I cannot give a greater proof of their induſtry, than thoſe fine roads

they have now made from Bilbao to Caſtile, as well as in Guypuſcoa and Alaba. When one ſees the paſſage over the tremendous mountain of Orduna, one cannot behold it without the utmoſt ſurprize and admiration.

The manners of the Biſcayners, and the ancient Iriſh, are ſo ſimilar on many occaſions, as to encourage the notion of the Iriſh being deſcended from them. Both men and women are extremely fond of pilgrimages, repairing from great diſtances to the churches of their patrons, or tutelary ſaints, ſinging and dancing, till they almoſt drop down with fatigue. The Iriſh do the ſame at their *patrons*. The *Guizones* of Biſcay, and the *Boulamkeighs* of Ireland are nearly alike: at all theſe aſſemblies, they knock out one another's brains, on the moſt trivial provocation, without malice or rancour, and without uſing a knife or a dagger. In both countries the common people are paſſionate, eaſily provoked if their family is ſlighted, or their deſcent called in queſtion. The *Chacoli* of Biſcay, or the *Shebeen* of Ireland, makes them equally frantic. In Ireland the poor eat out of one diſh with their fingers, and ſit in their ſmoaky cabbins without chimnies, as well as the Biſcayners. The brogue is alſo the ſhoe of Biſcay; the women tie a kercher round their heads, wear red petticoats, go barefoot, in all which they reſemble the Biſcayners, and with them have an equal

equal good opinion of their ancient deſcent: the poor Biſcayner, though haughty, is laborious and active, an example worthy to be imitated by the Iriſh.

So many concurring circumſtances ſupport the idea of their having been originally one people. It cannot be denied, but that the old Iriſh, whether from ſimilitude of cuſtoms, religion, and traditional notions, or whatever elſe may be the cauſe, have always been attached to the Spaniards, who on their ſide, perhaps from political views, have treated them with reciprocal affection, granting them many privileges, and ſtiling them even *Oriundos* in their laws, as a colony deſcended from Spain; yet, with all theſe advantages, if we except thoſe gallant ſoldiers who have diſtinguiſhed themſelves in the field wherever they have ſerved, few Iriſh have made a conſpicuous figure in Spain, or have left great wealth to their families. *

* Another inſtance in which the Iriſh ſeem to have cloſely imitated the Spaniſh cuſtoms, is in the taking of ſnuff, of which Mr. Howel, who was in Spain in 1620, and went ſoon after to Ireland, gives us the following account, at an early period, after the firſt introduction of ſnuff into Europe: "The Spaniards and Iriſh take it moſt in powder, or ſmutchin, and it mightily refreſhes the brain, and I believe there is as much taken this way in Ireland, as there is in pipes in England. One ſhall commonly ſee the ſerving maid upon the waſhing-block, and the ſwain upon the plough-

The King of Spain has no other title over theſe free people, than that, of Lord of Biſcay, as the kings of England formerly held over Ireland; they admit of no biſhops, nor of cuſtom houſes in their provinces, and as they pay leſs duties than the king's other ſubjects, they were not included in the late extenſions of the American commerce; however they content themſelves with that renown which they have acquired for themſelves and their iſſue, inſomuch that upon only proving, to be originally belonging to that lordſhip, or deſcended from ſuch in the male line, lawfully begotten, they are entitled to claim public certificates, or executory letters, termed *Cartas executorias*, expreſſive of their being *Hidalgos de Sangre*, or "Gentlemen of blood;" their nobility having been confirmed to them, by the kings of Caſtile and Leon, lords of Biſcay, in the plenitude of their power.

The moſt lofty Caſtilians have conſtant rivals for antiquity and deſcent in the inhabitants of Biſcay, Aſturias, and the mountains of Leon: thus, in Don Quixote, Dona Rodriguez, the duenna, ſpeaking of her huſband, ſays, he was as well born

plough-ſhare, when they are tired with labour, take out their boxes of ſmutchin, and draw it into their noſtrils with a quill, and it will beget new ſpirits in them, with a freſh vigour to fall to their work again"—Epiſtolæ Hoelianæ. London, 1726.

born as the king, becauſe he came from the mountains. *Y ſobre todo Hidalgo, como el Rey, porque era montanes.* †

Impreſſed with the flattering ideas, the high-minded Biſcayner leaves his native ſoil, and repairs to Madrid. Conſcious that this blood is pure, uncontaminated with mixtures of Jewiſh, or Mahometan race, he raiſes his hopes on honeſt induſtry, and ſobriety, fulfilling his duties with zeal, and ſubmiſſion; he often meets with relations in affluence, and ſometimes riſes to the higheſt employments. It ſhould ſeem that ſome ſuch character muſt have offended the immortal Cervantes, from his pointed reflections in his celebrated romance of Don Quixote, where he ſays that, "an expreſs being arrived with diſpatches of mo-" ment directed to Don Sancho Panaz, gover-" nor of the iſland of Barataria, into his own " hands, or thoſe of his ſecretary, which being " given to read to the major domo, by Sancho; " the imaginary governor aſked, Who here is my " ſecretary? To which one preſent anſwered, *I,* " *ſir, am the perſon, becauſe I can read and write,* " *and am moreover a Biſcayner.* With this addition, " replied Sancho, you are fit to be a ſecretary, " even to an emperor." *

LETTER

† Don Quixote, part 2. tom. 4. cap. ci. Madrid, 1771.

* Don Quixote, part 2. tom. 4. chap. c. Madrid, 1771.

LETTER XVIII.

Deſcription of the town of Bilbao, and the manners of its inhabitants.

THE town of Bilbao, on the banks of the river Ybaizabal, is about two leagues from the ſea, and contains about eight hundred houſes, with a large ſquare by the water ſide, well ſhaded with pleaſant walks, which extend to the outlets, on the banks of the river, with numbers of houſes and gardens, which form a moſt pleaſing proſpect, particularly as you ſail up the river; for, beſides the beautiful verdure, numerous objects open gradually to the eye, and the town appearing as an amphitheatre, enlivens the landſcape, and completes the ſcenery.

The houſes are ſolid and lofty, the ſtreets well paved and level; water is conveyed into the ſtreets, and they may be waſhed at pleaſure, which renders Bilbao one of the neateſt towns in Europe. Coaches are not in uſe, by which means, inequality of wealth is not ſo perceptible, exterior oſtentation is avoided, and the poor man walks by the ſide of the rich, with equal eaſe and content.

The air is generally damp, covers iron with ruſt, deſtroys

deſtroys furniture in the upper apartments, extracts the ſalt out of dried fiſh, and multiplies flies beyond meaſure, yet the town is remarkably healthy, and its inhabitants enjoy, to a great degree, the three principal bleſſings of life, perfect health, ſtrength of body, and a chearful diſpoſition, attended with longevity; in proof of which, though the town is very populous, the hoſpital is frequently empty, and in nine months, that Mr. Bowles reſided there, only nine perſons were buried, four of which were above eighty. Every day one may ſee men above that age walking upright, in chearful converſe with youth. Burning fevers, which the Spaniards dread ſo much and call *tabardillos*, are not known here, and they are ſeldom troubled with agues. What is then the reaſon that Bilbao, on the ſide of a river, in ſo damp a ſituation, and chiefly built on piles, like the cities in Holland, ſhould be ſo remarkably healthy, with every indication againſt it? I ſhall endeavour to account for it.

The adjacent mountains ſtop the clouds that ariſe from the ſaline vapours of the ocean, rains are frequent, but they are ſeldom without a ſea breeze, or a land wind; the current of the air being thus continually ventilated, never leaves the moiſt vapours at reſt, and prevents their forming thoſe putrid combinations, which heat generally occaſions, on ſtagnated waters; thus the

the vicinity of the ſea, the rains, and more than all, the ſtrong currents of air, are the phyſical cauſes of its ſalubrity at Bilbao, as on the contrary, the continued heat which rarifies the exhalations of ſuch rivers as have a ſlow motion, as well as the ſtagnated waters in ponds or lakes, where there is great heat in the air, and little wind, will be the cauſes of putrifying the vapours, and bring on fevers and other diſtempers. For this reaſon, the inhabitants of La Mancha are ſo ſubject to agues, and uſe as much bark as in Holland, becauſe the air has little motion in ſummer, notwithſtanding the country is open, and the ſurface is dry. In the ſame manner, a new houſe is dangerous to dwell in, where the damp vapours are confined, though one may ſleep very ſafely in the deepeſt gallery of a mine, if the air has a free circulation.

To theſe favourable circumſtances, the Biſcayners owe their good ſpirits, freſhneſs of complexion, and chearful diſpoſition. In other countries, women are oppreſſed with the ſlighteſt fatigue; here they work as much as the ſtrongeſt men, unload the ſhips, carry burdens, and do all the buſineſs of porters. The very felons, confined to hard labour in the mines of Almaden, do nothing in compariſon with theſe females; they go bare footed, and are remarkably active, carrying burdens on their heads which require two men to lift up. The wife yields not in ſtrength to the huſband, nor the ſiſter to the brother, and after a chearful

chearful glaſs, though heavily loaded, they move on with alacrity, returning home in the evening, without the appearance of laſſitude, often arm in arm, dancing and ſinging to the tabor and pipe.

Their muſic is defrayed at the expenſe of the town, after the manner of the antient Greeks. On holidays they play under the trees in the great ſquare; the moment they begin, the concourſe is great, men, women, and children, of all ages, are engaged at the ſame time, down to the very infants. The dances, are active, ſuitable to their ſtrength, but diveſted of indecent attitudes or geſtures. Theſe ſurpriſing women, though conſtantly expoſed to the air, have good complexions, with lively eyes, and fine black hair, in which they pride themſelves greatly, and braid to uncommon advantage. Married women wrap a white handkerchief round their heads, ſo knotted, as to fall down in three plaits behind, and over this the Montera cap. They have a haughty look, and work in the fields like the men; their language is the *Baſcuenſe*, which, without doubt, is original, and as antient as the peopling of the country, being totally diſtinct, and without any connection with any Spaniſh dialect; thoſe who underſtand it, aſſure us it is very ſoft and harmonious, as well as energetic *.

A general

* In the mountains of Biſcay and Navarre, the Spaniſh language, or *romance*, is neither ſpoken or underſtood.

See

A general neatneſs prevails every where in the town of Bilbao. The ſhambles is a Tuſcan building, in the centre of the town, with an open court and a fountain in the middle; nothing can be more cleanly or better contrived, free from all bad ſcents, or any thing diſguſting as it is copiouſly ſupplied with water to carry away every thing offenſive. The meat is delivered ſo freſh and clean, as not to require being waſhed, as practiſed in other parts of Spain, which deprives it of its ſubſtance and flavour; the veal is white and delicate, and the poultry excellent: the woods afford plenty of birds, beſides five ſorts of birds of

See the following books.

De la antigua lengua, poblaciones, y Comarcas de las Eſpanas en que de paſo ſe to can algunas coſas de la Cantabria por andres de Poza — Bilbao, 1587, 4to.

El impoſible vencido: Arte de la lengua baſconcada por manuel de Larramendi. Salamanca, 1729.

Diccionario Trilingue del Caſtillano, Baſcuenſe y Latin por manuel de Larramendi, 1754.

From whence it is evident that the Baſcuenſe is totally different from the Spaniſh, which is the common language of the two Caſtiles, Leon, Eſtremadura, Andaluſia, Aragon, Navarre, Rioxa, and the mountains of Burgos; and is generally underſtood in Aſturias, Galicia, Valencia, and Catalonia, though not the language of thoſe provinces, where they have a dialect varying more or leſs from the Spaniſh, in proportion to their ſituation and proximity to neighbouring kingdoms.

of paſſage, called *Chimbos*, which fatten ſoon after their arrival, and are greatly eſteemed.

Amongſt the different ſorts of fiſh common at Bilbao, there are two peculiar to that river, which the inhabitants are remarkably fond of; theſe are a peculiar ſort of eels in winter, and the cuttle fiſh in ſummer; the eels are ſmall like the quill of a pigeon, of a pale colour, about three inches long, and without a back bone, which they catch at low tides in prodigious quantities. In a word, every thing is in plenty at Bilbao, for beſides a well ſupplied market, their gardens abound in pulſe, and fruit of all kinds; ſo that one can live no where better than here, when we take into the account, the hoſpitable diſpoſition of the inhabitants, which ſoon falls off, if you ſlight their cordiality, or attribute it to motives of adulation or intereſt. Such is the happy life of the inhabitants of Bilbao, free from the luxuries as well as the ambitious paſſions, which agitate the minds of their neighbours, they paſs their lives in tranquility, governed by wholeſome laws; amongſt which they are ſaid, even to have one againſt ingratitude, with a puniſhment affixed to it.

LETTER

LETTER XIX.

Reflections on the injudicious method laid down in the Spaniſh ordinances, for the propagation of timber, being the ſubſtance of a memorial preſented by Don Guillermo Bowles, to his Excellency Don Julian de Arriaga, Miniſter of State for the department of the Indies and Marine.

TO judge of the quality of oak, fit for building, the four following circumſtances are to be conſidered; Firſt, the ſituation; ſecondly, the nature and depth of the ſoil; thirdly, the age of the tree, when it is felled; fourthly, the manner of laying it down to dry.

In mountainous countries, the beſt timber is from about midway, up to the tops of the mountains; its goodneſs rather decreaſes, in proportion as it approaches towards the valley. In the lower parts, the trees grow quicker, and are more ſightly; but as the roots muſt always partake of a greater ſhare of moiſture, from their ſituation, which expoſes them to the continual flow of water from the heights, the ſtem is not ſo vigorous nor ſolid; thus a tree on the top of the mountain, will not be ſo large nor beautiful at ſixty years of age, as another in the valley at forty; but let the builder

der be cautious how he truſts to outward appearances, otherwiſe he will certainly be diſappointed.

It appears from various judicious experiments, that oaks arrive at their greateſt perfection, at the period of fifty years, when the ſoil has above two feet depth, and at ſeventy-five years, when the depth exceeds three and a half; if it is above four feet, they then increaſe in vigour and ſtrength for upwards of a century. From whence it is evident, that trees, like animals, have their period of youth, maturity, and decay. When they ceaſe to grow, they are come to maturity, the conductory veſſels are obſtructed, the tubes turn to ſolid timber, the ſap ceaſing to circulate, becomes all ſpine or heart, and the tree remains in a ſtate of perfection, and reſt, for a term of twenty or thirty years. This is the proper time, between adoleſcence and old age, to fell the tree; if it was attempted while the ſap was yet in circulation, the timber would be liable to warp in hot weather, beſides many other defects. We muſt not imagine, that though this operation was performed in the winter, or what might be thought a proper ſeaſon, ſuch as the Spaniards call a good moon, according to the opinion of the ancients† that theſe inconveniencies

† The ancients had a great regard to the age of the moon in the felling of their timber. Pliny orders it to be in the very article of the change, which happening on the laſt day of the winter ſolſtice, the timber, ſays he, will be immortal.

encies would be removed. Oaks, reared from acorns, in plantations, prepared for the purpoſe, near villages, with the utmoſt care and attention, though afterwards tranſplanted on a mountain, will never be ſo perfect as thoſe that have grown ſpontaneouſly or even originally ſown there. Theſe two allegations will ſhew, that the Spaniſh ordinance of 1748, for the planting of mountains, committed two capital errors in its decrees; for it ſays, "That near every village, a nurſery ſhall be eſtabliſhed for the ſowing of acorns, manuring them every year; and when they are tranſplanted, the length of a foot is to be cut off from the root of every plant, while two or three feet of earth is laid round them, to make them grow faſter!"* This may do very well to obtain a fine avenue in a park, or form an agreeable grove, but will never anſwer the end of yielding good ſolid timber, proper for the building of houſes or ſhips; for, though it is certain that a tree tranſplanted, pruned, and well ſupplied with manure, may flouriſh, and have a beautiful appearance, yet this is obtained

* The words of the ordinance are as follow: "Que en cada lugar ſe ſenalara un vivero para ſembrar las bellotas, beneficiandole con eſtiercol cada ano, y en el miſmo acto del traſplante ſe cortara a cada arbol un pie de ſu planta, y para que creſcan con brevedad, ſe les arrinara dos o tres pies de tierra."—Ordenanza. De la cria y plantio de los montes. Del ano de 1748.

obtained at the expenſe of its conſtitution, by a precipitated vegetation. The intention of the ordinance was to leſſen the original defect, by tranſplantation on a mountain; but this expedient has not power enough to correct the error ariſing from its firſt propagation; and what is ſtill worſe, a further law contributes more fully to its decay, ſince it ordains that "they ſhould be pruned, in order to ſhoot up more vigorouſly, and that the ſtraight trees, which might be converted into beams or knee timbers, ought to be improved, by cutting the points of their principal ſhoots."‡ This regulation produces the reverſe of what was intended, and is the original cauſe of ſo many hollow oaks obſerved throughout Spain. For this reaſon the white mulberry trees of Valencia, and Murcia, are generally hollow, while the black ſort in Grenada is ſolid and healthy, becauſe the ſhoots are not pruned. On the road from Tortoſa to Valencia, I meaſured three monſtrous olive trees, entirely hollow, having ſcarce any ſubſtance beyond the bark, and yet they bore fruit. One of them was forty-one feet in circumference. I ſaw others, as large, at Villavicioſa, in Portugal, which were ſtout and ſolid, becauſe they had not been ſo barbarouſly

‡ The ordinance ſays, "Que las podas de los arboles ſon para que creſcan ſanos: y que los arboles derechos que pueden convertiſe en vaos, quillas y codaſtes, deben beneficiarſe cortando las punta de la guia principal."

barbarouſly treated: in a word, every tree uſed in the manner the king's ordinance directs, may thrive and grow for many years, but it will not attain to that criſis of time, between life and death, when it ought to be in a ſtate of perfection. Cedars and firs I allow, may be excepted from this rule, as their interior parts do not run any riſk from ſuch an operation, there being a great difference between trees, whoſe fibres are impregnated with a balſamic and incorruptible oil, and thoſe which draw their nurture from ſap, the ſuperabundance of which, tends to putrefaction; for the root of a tree increaſes, and grows, in proportion as the ſtem and principal branches require a greater ſupply of nurture. It is equally known, that the juices ſucked in by the roots, are annually diſtributed from the ſtem to the branches, affording life and ſupport to the leaves, flowers and fruit. For this reaſon the mulberry trees in Valencia, which are pruned every two or three years, begin to decay in five or ſix years, and the oak and cheſnut of Biſcay, which are uſed in the ſame manner for the purpoſe of charcoal, begin to decline, the former in ten years, and the latter in twenty, when they ought to be in their prime. On the contrary, thoſe oaks which grow in their natural ſtate, never tranſplanted nor pruned, nor receiving other ill-treatment, neither rot, nor become hollow, except by ſome particular accident, but

but puſh on to a venerable old age, till the courſe of nature has at laſt brought them to their final decline.

It is nevertheleſs allowed, that the ſmall portion of ſap diverted from its courſe by caſual pruning, which falls back into the ſtem, is not ſufficient to rot the tree, or cauſe any eſſential prejudice, provided the wound is ſoon healed, which cannot be done when the branch is large; and if the operation is often repeated, it will infallibly occaſion a caries. Let us admire thoſe beautiful elms planted by Charles Vth. at Aranjuez, about two hundred years ago, which now have a moſt amazing trunk, ſurpriſing by their height and bulk, ſome near ſix feet diameter, without the leaſt appearance of decay; when the trees of the Prado, at Madrid, from having been pruned, were rotten in leſs than a century; but at Aranjuez, when any of the trees are pulled up, though the tops are decayed from old age, they afford beams as ſolid as a walnut-tree, while the old trees of the Prado ſerved only for fuel; the ſame will happen with thoſe in the walks of the Delicias, near Madrid, though planted only thirty years ago, which from being repeatedly lopped, are already in a ſtate of decay, and will ſoon totally periſh.

The mulberry trees of Valencia yield a ſecond leaf, of equal ſtrength with the firſt that was

ſtripped off. I once aſked a peaſant why he did not avail himſelf of this ſecond leaf, for the uſe of the ſilk worms? he anſwered me, that it would be of infinite prejudice to the tree, and drain it of its ſubſtance. He was right as to the fact, though his reaſon was bad, becauſe the roots with their juices, ſupport the ſtem, branches, leaves, and fruit. If the branches are lopped, the ſtem grows hollow; if the firſt leaves are taken off, the ſap reverts, and mixes with what comes forth at a ſecond ſhoot; but if you take this off likewiſe, then the ſap recoils on the bark, and the heart, and the tree will be glutted by repletion, rather than ſtarved by inanition, as the labourer imagines. With reſpect to the method of felling of timber, it ſhould be done with particular attention to the trunk, ſo as to prevent a further effuſion of the ſap, otherwiſe a great part of that ſtrength, which it affords to the tree, when it condenſes, would be loſt. When the tree is felled, it ſhould be carefully placed in ſuch a manner, that the two extremities may reſt upon a prop of wood or of ſtone, two feet, at leaſt, from the ground, that the air may have a free circulation. If it lies on the ground, the moiſture would penetrate on one ſide, and it would dry on the other. Even in its raiſed ſituation, it will ſuffer in ſome degree, as its own ſhade will cauſe ſome alteration, for which reaſon the tree ſhould be turned two or three times in the year,

year, concerning which there are excellent inſtructions laid down by Mr. Duchamel de Monceau, and Mr. de Buffon, the reſult of philoſophical obſervations and repeated experiments. †

Many conſiderable advantages will enſue from a due obſervation of theſe principles, and may be

† While we are buſy in finding fault with Spaniſh ordinances, let us for a moment diveſt ourſelves of prejudices, and examine the glaring impropriety of ſome of our acts of parliament at home. The cutting down of the oak timber in the ſpring of the year, when the bark will eaſily part from the wood, as it is now generally practiſed in England, is alſo, according to Mr. Miller, a very great abſurdity, for the ſap of the trees being at that time in full motion in all their veſſels, the timber ſoon after cutting is cracked and torn in many places when expoſed to the air, and will not laſt a fourth part of the time, as that, which is cut in winter, when the ſap is thickened, and at reſt; yet there is an act of parliament to oblige every one to cut their timber at that ſeaſon for the ſake of the bark.--See Miller's Gardener's Dict. preface to folio edition, London, 1759.

Does not the following paſſage from the ſame author, ſpeaking of the French, breathe the ſpirit of a true patriot, as well as a philoſopher. "They do not neglect the culture of their own uſeful timber trees, particularly the oak, for as they ſeem to be very much in earneſt to improve and increaſe their marine, they are purſuing ſeveral ſchemes, which in time will enable them to carry their point. Surely then this ſhould not be neglected in Great Britain, as the welfare of this country principally depends on its ſhipping and commerce."

applied to the purpoſe of ſhip builders and carpenters; from theſe premiſes we may conceive the reaſon, that, of two houſes built by the ſame architect, one ſhall be ſolid, and remain in a due perpendicular, while the walls of the other ſhall give way by the dilatation or contraction of the beams; from hence we may perhaps be able to reſolve that curious problem, which has been propoſed to all the geometricians in Europe, to find out, why two ſhips, built by the ſame perſon, on ſimilar principles and menſuration, with timber from the ſame place, and cut at the ſame time, one ſhall go like the wind, and the other ſhall be the dulleſt of ſailers. One ſhall come home tight, and in good condition, from a long voyage, and the other ſo leaky, that the pumps muſt be kept conſtantly going. For my part, as I conceive that the dilatation of a beam, may throw a wall out of equilibrium, I imagine that the ſame effects, acting upon various bodies of timber, of different ſhapes and dimenſions, united together, and their action upon one another,* may give a new poſition to all the conſtituent parts, and a certain flexibility or inflexibility, which may have an effect on the ſwiftneſs, or ſlowneſs of its motion, through the

* The late learned Spaniſh Admiral, Don George Juan, publiſhed a very elaborate and ſcientific treatiſe on this ſubject, intitled, "Examen maritimo Teorico, Pratico, o Tratado de Mecanica aplicada a la conſtruccion, conociemiento y Manejo de los Navios, &c."—Madrid, 1771.

the water; and what is ſtill worſe, ſtrain particular parts, in ſuch a degree, as to make a ſhip very leaky. It perhaps may be objected, that theſe obſervations are only of moment in the northern, and moiſt diſtricts, and that they are of no ſignification with reſpect to the warm and dry air of the ſouthern provinces of Spain; but I beg leave to aſſert, that they will hold good in every climate, with more or leſs effect, and are of courſe worthy of the notice of the public at large, as well as thoſe individuals whom they may more particularly concern.

LETTER XX.

Deſcription of the iron mine, and forges, at Somorroſtro, in Biſcay.

THE famous iron mine at Somorroſtro, in Biſcay, has all the appearance of being alluvial, and originally compoſed by the congelation of ſome fluid matter, increaſing by inſenſible degrees, and reduced into a lamellated ſtate, ſucceſſively forming plates, or ſcales, one over the other, thinner than paper; as is evident from the many concavities and crevices, covered over by theſe plates; which ſuppoſing to be the caſe, we need not be ſurprized, at what has been advanced by ſome

ſome of the workmen, who aſſure us, that they have often found broken pieces of pickaxes, mattocks, and other inſtruments, in places that had been worked centuries ago, and are now replete with new ore; if this is a fact, we may further believe them, when they aſſert, that the mine increaſes, though the ſlow progreſs of nature, in this operation, does not permit us to calculate its gradation, or determine the number of ages ſufficient, to fill up a cavity of any given ſize.

From the above, it reſults, that a ſolution, evaporation, alluvion, and depoſition, all exiſt in this mine; its ſituation is an undulated hill; which, viewed from the neighbouring mountains, ſeems almoſt a plain; its form is regular, and one may go round it in about four or five hours. The ore forms an uninterrupted ſtratum, whoſe thickneſs varies from three feet to ten, and is covered with a coat of whitiſh calcareous rock, from two to ſix feet thick. I now proceed to their method of working this mine, where every one is at liberty to dig at pleaſure, and tranſport it by land or water, without being ſubject to duties or any formalities. The people being generally ignorant, and carrying away whatever comes uppermoſt, often take ore, which has its matrix of quartz, and is of a brittle kind, full of cracks; but the iron maſters, who are the purchaſers, are more verſed, and know what to buy, and what to reject. It is generally allowed,

allowed, that no iron in Europe is ſo eaſy to fuſe, or ſo ſoft as that of Somorroſtro. When the ore is firſt taken out of this mine, it has the colour of bull's blood, and when wetted becomes purple; great quantities are carried away by water, to the neighbouring provinces, where they fuſe it by itſelf, or mix it with ore of their own, which generally yields a harder iron; I ſhall only ſpeak of their proceſs with that ore which is fuſed without any mixture.

The firſt operation is to roaſt it * in the open air, by piling ſtrata alternately of ore, and wood, in order to divide the ore, repel the moiſture, and diminiſh

* No general rule can be given, concerning the duration, or degree of fire, for this purpoſe, theſe being various, according to the difference of the ores; a few days, or even hours, ſufficient for ſome ores, while others, ſuch as the ore of Rammelſburg, require that it ſhould be continued for ſeveral months. Shluter enumerates five methods of roaſting ores; viz.

Firſt, By conſtructing a pile of ore and fuel, placed alternately in ſtrata, in the open air.

Secondly, By confining the pile under a roof, without lateral walls.

Thirdly, By placing the pile under a roof, without lateral walls.

Fourthly, By placing the pile in a furnace, conſiſting of walls and roof.

Fifthly, By roaſting the ore in a reverbatory furnace, in which it muſt be contin ually ſtirred, with an iron rod.

diminiſh its weight, that it may be more eaſily fuſed, and the ferruginous parts ſeparated from the ſlag: when it is ſufficiently roaſted, they put it in the forge, with the due proportion of charcoal, and when it appears to have fuſed, by leaving on the hearth, a maſs of four or five arrobes, they lay hold of it with tongs, and place it on an anvil under an immenſe hammer, of about ſeven hundred to a thouſand pounds weight, and there by force of blows, and moving it about, they ſquare it, and reduce it into bars. The numerous ſparks which fly off from the blows of the hammer, are no more than the ſcoriæ of the metal. The bar thus ſhaped, may be doubled or lengthened in a leſs forge, if they pleaſe, and even beat cold as if it was ſilver. In this manner the ore is fuſed in a few hours, and the bars formed, and ſold to the blackſmiths. Formerly the iron was beat by mere ſtrength of arm, a proof of which may be gathered from the names of many places in Biſcay, ſituated where there is neither river nor brook, and begin, or end, with the termination *ola*, or *olea*, either of which in the Biſcay language, ſignifies iron works, ſuch as *Mendiola*, that is, "iron works of the mountain."

According to appearance, a quintal of ore will produce about thirty-five pounds of good iron, and the reſidue about thirty pounds of ſlag, and dead earth. As this mine neither contains ſulphur, nor

nor acids, it is not neceſſary to mix any calcareous ſubſtance to fuſe it, in order to abſorb thoſe matters, ſo troubleſome in mines, that have the misfortune to be loaded with them, as is often the caſe in France. However, it would not be amiſs to uſe a little of it, were it only to aſſiſt the fuſion of the ferruginous earth, accelerate the proceſs, and leſſen the ſlag, as well as the quantity of fuel. Theſe workmen, by conſtant experience, have acquired the proper method of managing the ore, as well as to know the quantity of coal for the forge, which is ſeldom larger than that of a conſiderable blackſmith; ſo that little improvement can be made on their labours; though by ſeveral experiments, made in 1773, by the *ſociedad Baſcongada*; or Biſcay ſociety, it appears that it would anſwer better to roaſt the iron, in a cloſe chamber, than in the open air. A good forge, well conducted, will yield to the owner above five hundred ducats a year; * ſome indeed, hardly produce three hundred, after paying all charges. It is neceſſary for them to be good œconomiſts, with reſpect to fuel, and to uſe ſmall forges; for if they were to have ſuch large ones, as are common in moſt parts of Europe, with all the apparatus of hammers and other implements, they would ſoon ſtrip their mountains of wood, and the forges would be at a ſtand for want of materials.

Beſides

* A Spaniſh ducat, worth about four ſhillings and eight pence, Engliſh money.

Beſides the mine of Somorroſtro, there are ſeveral others, ſome of which are worked, and others not. In one near Bilbao, the ore is ſeen above ground. About a mile from the town, there is a mine in a hill, of a quite different nature from that of Somorroſtro, being loaded with vitriol; it is an enormous maſs of iron ore, that attracts the vitriolic acid, which penetrating through the ferruginous rock, diſſolves the metal, and exhibits on the ſurface, ſmall laminæ of green, blue, and white vitriol. Oppoſite to this hill, on the other ſide of the river, another ſimilar rock produces a quantity of vitriol ſolely of a pale yellow, and though the colours green, blue, and yellow, may exiſt without any vitriolic acid, chemiſts are very well apprized from experience, that the common iron diſſolved in this acid, cryſtallizes into green vitriol, which we call copperas, forms blue cryſtals, with copper, and white cryſtals, or allum, when united with argillaceous earth, and of the ſame colour when it diſſolves zinc, and produces yellow, when it coagulates with the phlogiſton of common ſulphur, which abounds ſo frequently in the three kingdoms of nature. The moſt remarkable circumſtance, is to meet theſe colours in the Biſcay mines, which neither contain copper, allum, zinc nor ſulphur; nor is it an eaſy matter to account for it, without ſuppoſing that the pure elementary water, has a part in compoſing theſe cryſtals, and that its evaporation, either by heat, or air, alters the

the conſiſtency, and deſtroys the green colour of the vitriol of the iron, taking away that proportion of water, which conſtituted it, and that as ſoon as it loſes it, it begins to change colour, and paſſing through the various tints of green, and yellow, terminates in white, when all the water is gone: when it is come to that ſtate, and has a reſemblance to flour, it is called ſympathetic powder, on account of its ſtyptical quality, ſo readily ſtaunching the blood, in hemorrhages, and curing of wounds. Whoever chooſes to verify this theory, need only to pour water on this white powder, and he will find that it cryſtallizes anew into green. If it be aſked, why theſe matters do not unite, and form ſulphur, when there is ſo much acid, and iron in theſe mountains, and the iron contains ſo much phlogiſton? I anſwer, that for this event to take place, the vitriolic acid, and the phlogiſton, ſhould be perfectly concentred and dry; whereas the reverſe happens in theſe mountains, where they are ſo overwhelmed with moiſture, that the abundance of this acid, has perhaps been the cauſe, of many of the mines about Bilbao, being neglected, as of courſe they would yield ſo brittle an iron. This then would be the time to uſe a calcareous ſubſtance, to correct this defect. It is for this reaſon, the Swediſh iron is preferred to the Spaniſh, as the latter is ſo apt to redſear, that is, to crack, between hot

and

and cold. At a ſmall diſtance from this great ferruginous rock, an engineer lately cut away a conſiderable part of the hill, to improve the public walks, near the town of Bilbao, and as he made a perpendicular cut of about eighty feet depth, he diſcovered a vein of iron ore, lying in perfect ſtrata, which, at times, dipped in a direct line, and at others, obliquely, bearing ſome ſimilitude to the roots of a tree, occaſionally of an inch diameter, or the ſize of one's arm, with infinite variety of ramification, according to the more or leſs reſiſtance of the earth, to the paſſage of water; there being no doubt of this mine being alluvial. Here the very circumſtance has happened, which Don Antonio de Ulloa, judiciouſly imagined, would follow in the great hill of Potoſi, were it poſſible to lay it open and examine its contents.

It appears therefore, that the mines of Biſcay are in veins, ſtrata, and maſſes. The *Hematites*, * ſo frequently ſeen in the hollow parts of the veins, are remarkable for their different ſizes and forms; when

* Hematites, or blood-ſtone, is a hard mineral ſubſtance, red, black or purple, the powder of which is always red, ſometimes of an intermediate figure, and ſometimes ſpherical, ſemi-ſpherical, pyramidical, or cellular, that is, like a honeycomb, conſiſting of pyramids generally ſmall, the apices of which, appear in a tranſverſe ſection in the centre. It contains a large portion of iron; forty pounds of this

when broken, every grain was found to have the ſhape of a ſtar, which proves ſolution, depoſition, and a ſlow cryſtalization. Theſe hematites are exceedingly heavy, and if calcined give proofs of containing two or three times more iron, than the ore of Somorroſtro, but of a brittle and intractable nature. Beſides theſe hematites, there are in this mine, many cavities of different ſizes, from two inches to two feet, lined with a great deal of ferruginous matter, from one to three fingers thickneſs; this coating appears to be a true emery, and from hence, iſſue cylinders of ſtriped hematites, as large as the feathers of a pigeon, two or three inches long, not unlike a hedgehog; others have various and fanciful appearances, that would make objects of ſingular curioſity in the collection of a mineralogiſt, or in a cabinet of natural hiſtory. I deduce from the whole, that iron is ſoluble by pure water, and its vapour, as much as by ſalts. Therefore, we need not be ſurprized at meeting even pure iron in ſome mineral waters. Iron ores vary ſo much in their forms, that more properly they have no determinate one, as ſometimes they are earth, ſtones, or grains; accordingly thoſe

this metal have been extracted from a quintal of the ſtone, but the iron is obtained with ſuch difficulty, and is of ſo bad quality, that this ore is not commonly ſmelted. The great hardneſs of hematites, renders it fit for burniſhing and poliſhing metals.—Dictionary of chemiſtry, tranſlated from the French. London, 1777.

thoſe naturaliſts, who attend only to the external forms and appearances in claſſing of minerals, have been obliged to multiply the names of the ores, calling them ores in the form of peas, beans, coriander ſeeds, pepper corns, cinnamon, &c. which Mr. Cramer, not without reaſon, treats as ridiculous trifles. †

LETTER

† Dictionary of chemiſtry.—As in Navarre, and ſome of the ſouthern parts of France, they ſmelt iron ore, in ſmall furnaces, after a method ſimilar to that of Biſcay, a deſcription of their works by the ingenious tranſlator of the dictionary abovementioned, may perhaps not be unacceptable.

"The furnace conſiſts of a wide mouthed copper caldron, the inner ſurface of which is lined with maſonry a foot thick. The mouth of the caldron is nearly of an oval or elliptic form. The ſpace or cavity contained by the maſonry, is the furnace in which the ore is ſmelted. The larger diameter of the oval mouth of the cavity is about eight feet, and its ſmall diameter about ſix: the ſpace of the furnace is gradually contracted towards the bottom, the greateſt diameter of which does not exceed ſix feet. Eighteen inches above the bottom there is a cylindrical channel in one of the longer ſides of the caldron and maſonry, through which the nozzle of the bellows paſſes. This channel, and alſo the bellows pipe, are ſo inclined, that the wind is directed towards the loweſt part of the furnace. Another cylindrical channel is in one of the ſhorter ſides of the furnace at the height of a few inches from the bottom, which is generally kept cloſed, and is opened occaſionally to give paſſage to the *Scoriæ*; and above this is a third

LETTER XXI.

Obſervations on the Copper Mine of La Platilla, in the lordſhip of Molina.

THE remarkable hill of La Platilla, which name it has had time immemorial, is about two leagues to the north weſt of the city of Molina, capital

third channel in the ſame ſide of the furnace, through which an iron inſtrument is occaſionally introduced to ſtir the fluid metal, and to aſſiſt, as is ſaid, the ſeparation of the ſcoriæ from it. The greateſt height of the channel is at its external aperture on the outſide of the furnace, and its ſmaller height is at its internal aperture, ſo that the inſtrument may be directed towards the bottom of the furnace; but the ſecond channel below it has a contrary inclination, that when an opening is made the ſcoriæ may flow out of the furnace into a baſon placed for its reception. When the furnace is heated ſufficiently, the workmen begin to throw into it alternately charges of charcoal and ore previouſly roaſted. They take care to throw the charcoal chiefly on that ſide at which the wind enters, and the ore on the oppoſite ſide. At the end of about four hours a maſs of iron is collected at the bottom of the furnace, which is generally about ſix hundred weight. The bellows are then ſtopped, and when the maſs of iron is become ſolid, the workmen raiſe it from the bottom of the furnace, and place it while yet ſoft under a large hammer, where it

is

capital of the lordſhip of that name, on the river Gallo, thirty one leagues from Madrid. The mountainous country in which it is ſituated, forms a chain of hills, where an intenſe cold reigns nine months of the year. Here the waters of rivers divide; the Gallo runs towards the Tagus on one ſide of the hill of La Platilla, and on the other, the waters fall into the Ebro.

The ſummit of this hill conſiſts of whitiſh rock, marked with blue and green ſpots, and is about half a league to croſs over from one valley to the other, the aſcent being equally ſteep on both ſides. It appears on further examination to have been formerly a maſs of vitrifiable rock, that has decompoſed into ſmall ſtone, pebble, ſand, and earth, which with decayed leaves, and roots of plants, form

is forged. The iron produced in theſe furnaces is of the beſt quality; the quantity is alſo very conſiderable, in proportion to the quantity of ore, and to the quantity of fuel employed. In theſe furnaces no limeſtone or other ſubſtance is uſed to facilitate the fuſion of the ore. We ſhould receive much inſtructions concerning the ſmelting of iron ore, if we knew upon what part of the proceſs or circumſtance the excellence of the iron obtained in theſe furnaces depends; whether, on the quality of the ore, on the diſuſe of any kind of flux, by which the proportion of vitreous or earthy matter, intermixed with the metallic particles, is diminiſhed; on the forging while the iron is yet ſoft and hot, as the Marquis de Courtevron thinks, or, on ſome other cauſe not obſerved."

form that cruſt of earth which now covers the rocky part of the hill.

In the mine, there are pieces of white quartz, which riſe above ground from thirty to fifty feet, full of fiſſures in every direction; they gradually decay towards the bottom, and form into fine ſand and earth. If any one compares the decompoſition of this quartz, with the phenomena of its transformation under ground, it is clearly diſcovered, that new bodies are formed there; for in the galleries of the mine, perpendicular fiſſures, are not found in any uniform order, but a multitude of them, dividing the rocks without regularity, each diviſion afterwards ſubdivided into numberleſs ſmaller fiſſures, ſome of which are ſcarcely perceptible. The copper ore is formed in the interſtices, between theſe fiſſures, being blue, green, and yellow, mixed with a white limy earth. The largeſt fiſſure I ſaw was about three inches, and others only the breadth of a hair. Some have the ſuperfices only, covered with a thin blue, or green lamina, others are ſpotted, partly blue, partly green, with all the gradations and tints from the ſky blue to the lapis lazuli, and from a light, to the deepeſt green. In ſome parts the aperture of the ſtone is totally filled, and forms a body equal to the breadth of the fiſſure; but whatever be the ſize, it is always compoſed of parallel lamina, as thin as an eggſhell, and ſucceſſively depoſited one over

the other, by the water, which makes it indubitable, that this mine is alluvial; firſt formed by the decompoſition of the rocks, their recompoſition and moiſture.

This lamellated metal is compoſed of various plates, which I call primeval, ſome are chequered with ſmall hollow round grains, hardly ſeen with the lens, which I conceive are formed by bubbles of air, at the time of the decompoſition of the rock, and the forming the drivel of the metal. Theſe bubbles impreſs their figure on the lamina above, and occaſion thoſe beautiful grains, from whoſe variegated waves in the concentrical lamina, reſults that beauty of colour in the ſtone, when poliſhed, which ſurpaſſes thoſe of the eaſt, and would ſtand unrivalled, were its hardneſs, equal to the peculiarity of its ſhades.

Having examined one of theſe lamina, of a line in thickneſs, I found it to conſiſt of three and twenty leaves, the white calcareous earth was formed by the drivel of the copper, at the inſtant of decompoſition, and always follows it, covering the ore, as well in the green, as in the blue, and yellow, and when this white earth abounds, then the green ore is of a very pale hue. Breaking a piece of the ore, fiſſures are ſeen in the centre full of a green or yellow matter, and if there is any cavity, there are ſmall blue cryſtals, like fragments of ſapphires; others, green like emeralds, and true rock cryſtal, blue,

blue, or green *. I broke one of theſe cryſtals that was fixed in the hollow part of a rock, and was ſolid without. It was as green as an emerald, in the centre, without the leaſt appearance of crack, or crevice, exteriorly; which I put into an acid, when all the green matter diſſolved, and the cryſtal remained perfect and entire, except a ſmall cavity in the centre. To explain the forming of this cryſtal, it is neceſſary to ſuppoſe that the copper and calcareous earth were formed by the decompoſition of the rock, by ſome interior labour, and that the limy part mineralized the copper, and covered its atoms, without any communication of acids, fixed or volatile alkali, ſulphur or arſenic, for the matter being calcined does not yield any ſmoak, neither emit a ſulphurous ſmell, and expoſed to the air many years, does not decompoſe, acquire taſte, or change colour.

When I find this calcareous earth cloſed within the fiſſure of any ſolid rock, and any part of it mixed with the mineral, while the remainder ſerves for its matrix, and that there is no other ſimilar earth thereabouts, I conclude that the aforeſaid calcareous earth is formed by the decompoſition of the

 rock

* Mr. Bowles ſays, that they are not ſapphires, nor emeralds, as thoſe two ſtones will diſſolve in acids; *(a fact which cannot be admitted)* like the green or blue colouring parts of rock cryſtal, and that thoſe of this mine will not diſſolve.—Introduccion a la hiſt. nat. &c. page 197.

rock which it is in. I ſay the ſame when I meet quartz mixed, and united with the rock, for on breaking it, the ſtone may be perceived half decompoſed, with ſome part of clay in the centre. Various ſtalactites are found in the excavations from this mine, which if well conſidered, prove the origin and diurnal formation of the copper, and decompoſition of the rock; one evidently perceives the mineral begins to be diſſolved, and fluid, or at leaſt in a mucilaginous ſtate, as its waves demonſtrate its flowing in a very gentle manner; but when rain water has forced a paſſage through the crevices, and meets with that kind of metalic drivel, before it is thoroughly dry, or acquired a ſufficient conſiſtence, it carries it forward, till it comes to ſome cavity, and there, drop by drop, it depoſits it, and forms the ſtalactite, ſometimes like a hollow reed, with bubbles in it, occaſioned by the air, but more frequently ſolid, from the viſcoſity of the matter. I obſerved, by analyſis, that thoſe ſtalactites of the moſt perfect green, contain ſix eighths of pure copper, and two eighths of calcareous earth; they are ſmooth, hard, and without ſmell, and do not decompoſe either in the air or boiling water; but the green, blue, and yellow ſtones, found here, are the reverſe of the ſtalactites, diſſolving in the weakeſt acid. I do not call theſe blue, and green ſtones, cryſtals, becauſe they are not ſo, though they have that appear-

appearance, as is proved by experiments; nor do I ſay, that the green is a *malachite**, it not being yet decided, whether this is a green vitrifiable ſtone.

In the cracks formed by the decompoſition of the rocks, there is a great deal of cinereous and yellow clay, particularly where there is the moſt mineral. Theſe clays ſeem to precede the formation of the white and yellow calcareous earth, whoſe quantity is always equal to that of copper; ſo that if one is abundant, the other is ſo likewiſe, and vice verſa. This yellow earth deceived me at firſt, having a notion that its mixture with blue, formed the green ore, remembering to have ſeen the dyers compoſe their green colour, by an aſſemblage of yellow and blue, and that the phyſical cauſe of the greenneſs of leaves, proceeds from the mixture of thoſe two colours; and finally, that there are ſeveral plants, indigo, for example, whoſe juices are deſtroyed by fermentation, and the blue colour remains in the *feculæ*; but in all this I was miſtaken, as the blue ore does not mix with the green, they being of different natures; for the blue appears, by experiments, to contain a little arſenic, ſilver, and copper, which, when fuſed, forms a kind of bell metal; but the green

* Copper mixed with gypſum, or plaſter, Green. Is found at Ordal, in Norway, and there called Malachites. —Cronſted, ſect. cxcvi.

ore has not the leaſt atom of arſenic, and the copper mineralizes with the white earth abovementioned, without having the leaſt part of iron. This mine of Platilla, being of an adventitious nature, has no great depth, and lays in ſtrata. If the miners go deep, they are deceived; for though the mine may dip, in a ſlight degree, which perhaps in a thouſand years might form a rich vein, the ore is diſcovered, at preſent, from three, to forty feet depth at furtheſt.

Many have thought that mines are only found in barren diſtricts; but this is an error, that of La Platilla is a proof of it; for though the ore is ſo near the ſurface, the ground is covered with plants. The ſame happens in the quickſilver mine at Almaden, where they ſhoot up even within the precincts of the furnaces, in the ſame manner as in other places, where no mines are to be found. In that of La Platilla, where the veins are arſenical, and not above a foot of earth over the ore, the following trees and plants are conſtantly ſeen; the oak, holm, ciſtus, hawthorn, juniper tree, ſage tree, dwarf ciſtus, baſe horehound, bell flower, ragwort, cornflag, orchis, Bethlem's ſtar, *muſcari*, or fair haired hyacinth, milkwort, and above thirty other ſpecies, which grow in cornfields, or meadows, on the road ſide, and even on the ſea ſhore. The low lands are covered with the ſame ſort of graſs as the reſt of the country, and ſerve for

paſture

paſture to thoſe numerous herds of cattle for which the territory of Molina is famous.

Theſe obſervations occur in different kingdoms. The mines of Sainte Marie, are covered with oak, fir, apple and pear, cherry and plumb trees, with good paſture and corn, in a ſoil, about two feet in depth, covering the moſt ſulphurous arſenical rocks, of ſilver, copper, and lead mines in Europe, where the very veins are often ſeen above ground. An equal fertility reigns near the mines of Clonſthal, on the mountain of Hartz, belonging to Hanover, with excellent paſture. The ſame happens on thoſe of Freyberg, in Saxony, that are covered with barley, in June; it being a ſingular ſight, to ſee a body of people, reaping the corn over the heads of a thouſand miners below, buſy in digging out paſſages, and blowing up rocks, full of arſenic, and ſulphur. Some mines, without doubt, are found under bare rocks, though this barrenneſs does not proceed from any mineral vapour, but from different cauſes, and chiefly, that, moiſture, heat, and cold, have more power on ſome rocks, than over others. This is the caſe with the great mountain of Rammelſberg, at the foot of which ſtands the imperial city of Goſlar, ſo famous for its ſilver mines, where the looſened ſtone may be obſerved to crumble away, and be covered with moſs, and verdure: inſomuch that though the period is not yet

yet arrived, for its entire decompoſition, ſoon, or late, it will happen, and be covered with graſs, in the ſame manner as the mountain of Hartz is at preſent.

☞ About a quarter of a league from the city of Molina, there is a ſpring whoſe waters have a ſmell like rotten eggs, from being impregnated with ſulphur and alkali: thoſe who have analyzed them, aſſures us, that they are of the ſame nature with the ſprings near Gibraltar, and the waters of Cotterets, in France, and equally uſeful in cutaneous complaints. The river Gallo abounds in ſalmon trout, from half a pound to four pounds weight. About a quarter of a league from the town, the river contains a fine white earth mixed in its waters, which incruſts the earth and ſuch plants as it touches, with a limy ſubſtance, though the water appears clear and limpid.

LETTER

LETTER XXII.

The ſource of the Tagus and its environs deſcribed.

IN going from Molina de Aragon, to the weſtward, you croſs over mountains filled with petrifactions, which appearance laſts for two or three leagues. At the third league there is a ſalt ſpring which ſerves the people of Molina. The aſcent is continual, through a wood of fir, and over mountains, till you reach the village of Peralejos on the banks of the golden Tagus, ſo often ſung by the poets, ſo frequently extolled by hiſtorians.

At Peralejos, the Tagus is only fifteen paces wide, and one foot deep. The petrifactions are obſerved again in the village, and the river runs through a narrow channel it has made for itſelf; between two lofty mountains of marble, perpendicularly ſlitted near a hundred feet high. Each mountain is a ſolid block, without either horizontal, or perpendicular fiſſure, if we except thoſe caſual crevices, occaſioned by the enormous pieces which now and then detach themſelves, and roll down to the banks of the river. Such as have tumbled down on the ſouth ſide, have crumbled into

into good earth, and as the water filters through them, the ſoil is fertile, covered with graſs, and different plants, ſuch as purging buckthorn, ſervice, Spaniſh cherry, black briony, agrimony, pimpinel or common aniſe, and butterwort ſweating drops of water. The oppoſite mountain is bare, without moiſture, earth, plant, or moſs, being a ſtupendous rock reſting on a bed of marble, mixed with white gypſum, veined with red, and priſmatical ſtellated ſpots.

About three quarters of a league to the ſouthward of Peralejos, you meet the higheſt hill in thoſe parts called Sierra Blanca; its top is capped with calcareous rock, its body of white ſtone not calcareous, decompoſed in the ſame manner as the former, with veins of imperfect jet, of the thickneſs of one's finger, with ſoft grainy pyrites † of the colour and odour of thoſe found in the clays of Paris. Veins of bituminous wood extend from a finger to a foot in thickneſs, and contain pieces of

† Pyrites is a mineral reſembling the true ores of metals in the ſubſtance of which it is compoſed, in its colour or luſtre, in its great weight, and laſtly, in the parts of the earth in which it is found, ſince it almoſt always accompanies ores. From the property of ſtriking ſparks from ſteel, they have been called Pyrites, which is a Greek word ſignifying fire-ſtone; they were formerly uſed for fire-arms as we now uſe flints, hence it was called carabine ſtone, ſtill by ſome marcaſite. Perhaps no other kind of natural body has had ſo many appellations. Perſons curious to know the

of jet, as large as one's head, others leſs, but always with vitriolic pyrites, diſperſed in the very ſubſtance, and interſtices of the jet. It ſeems clearly to be wood, as ſome pieces have ſtill the bark on, exhibiting the knots, fibres, and other parts, with little alteration, ſtill preſerving their ligneous original, mixed with that, which compoſes the true and ſolid jet. What is ſtill more extraordinary, veins of a lead mine are likewiſe found in it, following the oblique, or direct crevices of the wood, while other veins of lead traverſe its fibres, in a perpendicular line, as well as horizontally, and ſome ſmall lumps are fixed in the very ſubſtance of the wood. In a word, the four principal orders in mines, may be obſerved here in a ſmall compaſs, as it were in minature, viz. perpendicular veins, croſs veins, ſtrata, and maſſes. Theſe veins are the more extraordinary, if we conſider the manner in which the metal muſt have introduced itſelf into the timber, for it cannot be ſaid to have made its way through the pores, when the lead was in a fluid ſtate, becauſe pieces of wood are found, whoſe exterior parts do not ſhew the leaſt particle of lead, yet on breaking them,

the other names leſs uſed, may find them in Henekell's Pyritologia; we think with that celebrated chemiſt, that the ſubject has been perplexed by this multiplicity of names, for before his great and excellent work, the notions concerning Pyrites were very confuſed and inaccurate.—Dictionary of chemiſtry.

them, ſome portion of this mineral is diſcovered within, which could only introduce itſelf there, when the ſap firſt formed the wood. The country people in this neighbourhood burn this wood, and make ſhot of the lead, that runs from it, which ſerves to kill hares, partridges, and other kinds of game, with which the country abounds. The ſource of the Tagus is about a league from the hill of Sierra Blanca, in the higheſt ſituation of Spain, for the waters of this river run down to the ocean, and thoſe of the Guadalaviar whoſe ſource is contiguous, fall into the Mediterranean. The waters called *Vegas del Tajo*, are at a league and a half from hence, in a valley, formed by the river, which has its ſource in a copious ſpring, called *Fuente de la Abrega*. This brook, for here it deſerves no better appellation, meanders ſo often, that it muſt be croſſed four times in the ſpace of half a league. Many have thought the ſource of the Tagus was at *Fuente Garcia*, which is five leagues higher up, but Mr. Bowles aſſures us to the contrary, adding, that *Fuente Garcia* is a trifling ſpring, which he covered with his hat, being no more, than a ſmall quantity of water, collected in the trunk of a hollow tree, placed there to hold what iſſues from a puddle of ſtanding water, which three paces further, loſes itſelf in the adjacent valley, without a drop of it reaching the Tagus.

Half

Half a league from *Fuente Garcia*, there is a ſalt ſpring which ſupplies the town of Albarracin, and eighteen villages, in its juriſdiction, with ſalt. The country from hence to the true ſource of the Tagus, is an elevated plain, rather uneven, with a good carpet of graſs, and a great many brambles, whoſe berries afford an ample repaſt for the black birds. It is alſo well ſtocked with that tree called in Spain *Cedro Hiſpanico*, the juniper thurifera of Linnæus, a tall ſtout tree, with berries like the juniper tree of the large ſort *. The ſnow remains on the ground in theſe cold regions, until June, and the country is a continued chain of hills, known by the name of the *Sierra*, replete with various ſingularities. From Peralejos hither, different petrifactions are found, ſometimes in the rock, and at others in the earth. If the ſea depoſited

* The juniper thurifera, or Spaniſh juniper, is an evergreen, little known out of Spain, though it might be of much uſe; it grows very high, and is ſimilar to the juniper tree, we have in England, but the berries are larger than thoſe of the ſpecies we have. I was informed in Spain, by a gentleman to whom I am indebted for many communications in the courſe of this work, that Dr. Ortega, who has viſited this country, had aſſured him, we have it not in England; probably the climate of Spain is more favourable for its growth. Mr. Bowles calls this tree *Cedro Hiſpanico*, but makes it ſynonymous with another tree, by ſaying *Cedro Hiſpanico* o *Alerce*, whereas the *Alerce* is the *pinus larix* of Linnæus.

poſited them there, it would be difficult to explain how this ſhould have happened in the higheſt ſituation in Spain.

To return to the Tagus: this noble river paſſes by the royal palace of Aranjuez, the city of Toledo, Almaraz, and Alcantara in Eſtremadura; then enters Portugal, at Abrantes, and rolls its waters with dignity into the ocean at Liſbon. Philip the ſecond opened the navigation of this river; the firſt boat diſpatched by his majeſty, arrived at Aranjuez, from Liſbon, on the 19th of January, 1582, and then returned to Toledo, to proceed down the river again *; but ſucceſſive events, and an alteration of dominion under Philip the fourth, put a final period to theſe improvements. The ancient poets have been laviſh in their praiſes of the Tagus; Silius Italicus, ſays,

"Ore excellentem et ſpectatum fortibus auſis
Antiquâ de ſtirpe Tagum, ſuperumque hominumque
Immemor."

Faria de Souſa, in his hiſtory of Portugal, relates, that king Dennis made a rich crown and ſcepter with the gold found in the bed of this river. Many people are ſtill employed near Toledo, in theſe reſearches, after floods, and have collected

* Dichos y hechos de Don Philipe 2do. I
Porreno. Madrid,

collected a great number of gold coins and trinkets †; though Don Antonio Ponz insinuates, that he looked in vain there for gold sand, and seems to think, that enough of it, had never been found to purchase a pair of pigeons in the market.

LETTER XXIII.

Mine of Cobalt, in the valley of Giſtau, in the Pyrenees of Aragon. *

THE valley of Giſtau is almoſt on the ſummit of the Pyrenees, for very near it, at *El Hoſpitalet*, the

† Many of theſe curioſities had been collected by Don Franciſco Santiago Palomares, of Toledo, who dying in 1775, his library and cabinet was purchaſed by his excellency Don Franciſco Lorenzana, and preſented to the public library, lately erected in that city. Another ſimilar collection was left by Don Juan Antonio de las Infantas, dean of Toledo, to the college of St. Ildefonſo, at Alcala.—— Viage de Eſpana, por Don Antonio Ponz, ſecunda edicion. Madrid, 1776.

* The kingdom of Aragon was formerly united to that of Navarre, and continued ſo till 1203, when Sancho the Great, who had married the heireſs of the county of Caſtile, divided his dominions amongſt his children. Garcias, the eldeſt, had Navarre, Ferdinand had Caſtile erected into a kingdom, and united to that Leon, by marriage with Sancha, only daughter and heireſs of Bermudo, laſt king of Leon. Gonſalve had Sabrarve and other territories, and to Ramiro, his natural ſon, he gave the kingdom of Aragon,

the waters of France and Spain divide. The river Cinca has its ſource here, and, paſſing by Plan, falls into a gully, two hundred feet broad, between two rocks perpendicularly open, above a thouſand feet high, and then paſſes on to the Ebro, which it enters at the loweſt part of Aragon. Theſe two rocks are like walls, where one plainly perceives the waters have forced a paſſage through, as the different coloured ſtrata of ſtone, are ſimilar, and exactly oppoſite to each other, on both ſides.

The mountain of Plan is of an extraordinary height, made up of five or ſix hills, piled one upon another, whoſe diviſions are in proportion to the more or leſs reſiſtance of the rocks, and the quantities of earth brought down by the rains, or high winds. In the month of June I went into France, through the valley of Aure, § exploring

gon, with the conſent of the queen, in recompenſe for his bravery, in offering to ſupport her innocence by ſingle combat, againſt the king's ſons, who had charged her with incontinency; the falſity of which accuſation, was diſcovered by a monk, who revealed their confeſſion to the king, on which the queen's innocence was proclaimed, and the combat laid aſide, as is fully related by Roderic Archbiſhop of Toledo. ——" Roderici Toletani de Reb. Hiſp. Lib. v. chap xxv.

§ This is Mr. Bowles's itinerary, which is preſerved entire in the courſe of this letter.

ing my way over thoſe craggy hills which had then above five feet of ſnow. There are a great many bears, as well as roe-bucks, which are hunted by the people of the country, and now and then they meet with the linx. The mutton is excellent. I bought a ſheep for a dollar, (3s. 6d.) and had it dreſſed with *chenopedium pirenacum*, "wild ſpinnage" which is found in great plenty on theſe hills, where I ſhivered with cold, in the dog days, and ſaw a great many white partridges, but not a ſingle fly.

There are three lead mines and one of copper, in the neighbourhood of Plan, and a good iron mine at Bielſa; which is worked with much judgment: alſo much lime rock, and gypſum, as white as ſnow, and large lumps of grey granite, diſperſed in the bed of the river Cinca, where there is no ſand, but ſtones of this kind, from the largeſt to the moſt diminutive ſize. One likewiſe finds grit ſtone of the ſame grain and colour, as that on the mountain of Elizondo in Navarre, and a great deal of mill-ſtone; the beſt of theſe are generally at the top of the mountain, being the hardeſt and moſt compact, better even than thoſe in the centre. One ſhould always prefer thoſe with viſible, and deep pores, and ſmall cavities, as the heat ariſing from the friction, is by this means diſperſed over the whole maſs. This is the ſort found at Giſtau. Thoſe that are ſmooth grained, generate too much heat, which has an effect on the flour. The ſoft ones

are the worſt of all, requiring conſtant repairs, and ſoon wear out, beſides the inconvenience of rendering the bread gritty.

Having made ſome experiments at Plan, on ſome lead ore, I found in a ſlaty mountain, called Sahun, I diſcovered it to be mixed with white ſpar, and ſo abundant and eaſy to fuſe, that it left fifty pound of lead per quintal, notwithſtanding that the plane had not a ſufficient declivity, for the metal to run off, as it ought to do.

The environs of Plan abound in fir, oak, and beech, of which they make charcoal for the mines; and here one finds that extraordinary mine of Cobalt, † which has not its equal in Europe, except that famous one at Shoenberg, in Saxony, for whatever is found in other places is mixed in arſenical

† Ores of cobalt reſemble thoſe of antimony; their ſurface is almoſt always covered with an efflorescence, of a dingy ſcarlet. Theſe ores contain a good deal of arſenic, and it is from them that arſenic is uſually got; they alſo frequently contain a portion of biſmuth. Thoſe which contain cobalt alone, are very rare: Cobalt mines bring in a conſiderable revenue to Saxony, where the ores are worked with a good deal of intelligence.——Beaume manual of Chemiſtry.

☞ In the year 1755, Mr. Bowles was ordered, by the court of Spain, to attend his Excellency Don Joſeph Auguſtine de Llano, to the manufacture of Zaffre, at Gingemback, in the Black Foreſt, in Germany.

arſenical veins of lead, or ſilver, and in ſuch ſmall quantities as not to deſerve any particular notice. I ſhall now relate the particular circumſtances I was informed of, concerning this famous mine at Giſtau.

At the beginning of this century, a perſon having obſerved, that ſome ſtone, found in a ſteep mountain, ſituated to the North Eaſt of that, of Plan, was more heavy than uſual, it induced him to ſuſpect, it might be ſilver ore, on which he repaired to Zaragoſſa, and ſhewed it to a perſon converſant in mines; but after various fruitleſs eſſays, no ſilver was found; at laſt they diſcovered it to be a mine of cobalt, and ſome ſpecimens of it were ſent to the manufacturers of Zaffre, in Germany, where, finding it, on trial, to be good, they determined to get poſſeſſion of it, without appriſing the Spaniards of its value. To carry on this ſcheme the better, a German was ſent into Spain, to conclude this buſineſs with the ſimple Aragonian, and it was agreed upon, between them, that the Spaniard ſhould petition his court for a grant of the mines of the valley of Giſtau, on ceding to the king, a certain quantity of lead, yearly, at a low price; on which condition the grant was eaſily obtained; none ſuſpecting that theſe mines contained any other mineral. A private agreement was further entered into, between the German and the Spaniard, that the lat-

ter ſhould yield to the former, all the cobalt they might get out of the mine, at the price of thirty-five *peſetas* per quintal, groſs weight.*

The people of Aragon, underſtanding little of mines, Germans were ſent for, and they begun to extract the cobalt, which they found about half way in the mountain, on whoſe ſummit there was another mine, called after Philip the IVth, perhaps from its having been attempted in his reign, though I do not know what ore it contained, but ſuſpect it to have been cobalt; which, not being much known, at that time, nor its uſes in commerce,† was ſoon after abandoned, no ſilver

* A *piſeta*, or piſtreen, is a ſilver coin, worth about tenpence ſterling.

† This ignorance of the value of cobalt is not peculiar to the Spaniards; the ſame happened in Germany, where we are informed, that, for want of a ſufficient knowledge of mineralogical ſcience, quantities of rich ores, and foſſile ſubſtances, have been formerly thrown away amidſt the rubbiſh. There is ſcarce a mining country, in which they have not, ſome time or other, paved their highways with ſtones, and rocks of value; I know, from very reputable authority, (ſays a German writer) that, this was formerly the caſe of the cobalt ores in Hiſſe, which at preſent, produce an annual revenue of about £1400o. ſterling, clear of all expenſes. "Raſpe's preface to his Engliſh tranſlation of Baron Born's travels through the Bannat of Temeſwar, Tranſylvania, and Hungary, in 1770. London, 1777.

ver appearing, which, was probably their object; but I am ſurprized they ſhould have filled it up again, when they left the other mines of copper, and lead, open, which are in the very ſame place.

The Germans, for a long time, got out of this mine about five or ſix hundred quintals per annum, ſent it from Plan to Toulouſe, where it was embarked on the canal of Languedoc, and then by Lyons and Straſburg, forwarded to their own manufactures. After they had, in a manner deflowered the mine, and got as much ore as they could eaſily extract, it was probably no longer an object of intereſt, and then they abandoned it, which happened a few years before I arrived there, in 1753.

Impatient to viſit this mine, I went to it immediately on my arrival at Plan, and found many ſhafts in all that part of the mountain, for as cobalt does not run uſually in veins, the Germans had tried different places, wherever they thought they could get it moſt readily. On examining theſe ſhafts, I found ſeveral pieces of good cobalt, of a finer grain, and the blueiſh grey colour, lighter, than that of Saxony. I cannot give an idea of it, to thoſe who have not ſeen it, nor teach them, to diſtinguiſh it from other metals, of the ſame colour, as without ocular inſpection,

ſpection, explanations are to very little purpoſe; however, I ſhall juſt add, that moſt of the lumps of cobalt I found here, were contiguous to a kind of hard ſlate, as gloſſy as if they were varniſhed, with ſpots, of the colour of a dried roſe, without touching the cobalt, though it was as much expoſed to the moiſture as the ſlate: nor have theſe roſe-coloured ſpots, either grown livelier, or paler, during the many years I have had them in my cabinet. Theſe ſpotted plates may ſerve as a direction to ſuch as are employed in ſearch of this mineral; for my part, I could not make any further obſervations with exactneſs, as the excluſive charter was ſtill in force, and they watched my motions with jealouſy, therefore was obliged to be ſatisfied with the obſervations I had made, without excavations, and quitted Spain about that time.

Should the Spaniards ever think ſeriouſly of Cobalt, as it exiſts in this mountain, and probably in other parts of the kingdom, as well as in America, I ſhall add the following directions for its diſcovery, not intending it for the uſe of chemiſts by profeſſion, who are not in any need of it, but only for miners, who have never ſeen any Cobalt, or for ſuch, who, having no judgment in ores, conclude that all matter which is weighty, and yellow, muſt certainly contain gold, ſilver, or other precious metals.

If

If the heavy grey ſtone which they find, is united with the gloſſy black ſlate abovementioned, there is no doubt, but that it is cobalt, of which that ſlate is the blend. If the ſtone is quite detached from the ſlate, draw lines on it with a pointed iron, and if the lines appear to be black, it is a ſtrong indication of its being cobalt: for greater ſecurity, break the ſtone, and reduce it into powder, put it into a thin glaſs phial, for the thinner it is, the leſs liable to break; then place it in an iron veſſel, filled with ſand, ſo that the neck of the phial may be open, and the bottom not in contact, with that, of the veſſel, then put it into a common kitchen oven: all the arſenic will evaporate at the neck of the phial, and the cobalt will be purified. After this proceſs, it ſtill preſerves its grey colour, and, mixed with ſand, and the aſhes of ſoda and barilla, is what the Saxons call zaffre; this mixture is made, becauſe ſand and quartz, are infuſible, without the aſſiſtance of barilla, or fixed alkali; but with it, they ſoon vitrify, and communicate the ſame property to the cobalt. If this zaffre is melted with a vitreous fritt, it changes into a blue glaſs, called *ſmalt*, when in maſſes, and *azure*, or *enamel blue*, when reduced into a fine powder, uſed by painters, for that beautiful blue on porcelain, and in other manufactures. *

In

* Mr. Bowles in a note finds fault with the Encyclopedie, and

In the eſſays made on Spaniſh cobalt, in Germany, it appeared to be entirely free from foreign matter, and ſo rich, of the blue colouring earth, that it imbibed three or four times more ſand or quartz, than, that of Saxony. About the year 1746, it was a great faſhion, in Paris, to make ſympathetic ink. I ſet about making of it, as well as the reſt, and gave nine livres* for a pound of Spaniſh cobalt, with which I made my ink, which was more eſteemed than any they had ſeen, the green colour being much more lively, than if made with the cobalt of Saxony. The Spaniſh mineral has not even the grey colour of the Saxon, but is blue, like melted lead, inſomuch that in ſeveral manufactures, and particularly

and other writers on chemiſtry, for ſaying, that the cobalt and zaffre of the Eaſt, are nearly exhauſted, and that we have no foundation for ſuch an aſſertion, and ought rather to apply the inferiority of their modern colouring, to their craft, on finding us ſo eaſily ſatisfied. But the principal reaſon given by theſe writers, is, on account of the conſiderable quantity of zaffre and ſmalt now exported from Europe to China, which Mr. Bowles takes no notice of. Zaffre has been thought of ſuch uſe in England, that the ſociety for the encouragement of arts, manufactures and commerce, promiſed in 1755, a premium of 30l. for making the moſt and beſt zaffre, and ſmalt from Engliſh cobalt, not leſs than 5lb. weight of zaffre, and 15lb. of ſmalt to be produced before the ſociety, with ſatisfactory certificates.

* About ſeven ſhillings and ſix-pence ſterling.

cularly that of Count Aranda for delf-ware, at Alcora, in Valencia; they uſe it without any other preparation than pulveriſing the ſtone, as it is taken out of the mine, and with this blue powder in its natural ſtate, they paint the ware without further proceſs. §

LETTER

§ Cobalt has been found in Cornwall and Scotland, and probably in other parts of Europe, of various colours and hues, mixed with different ſubſtances, which mineraliſts have fully deſcribed, particularly Cronſted. Wallerius enumerates ſix different ſpecies thereof. If well calcined cobalt be treated with inflammable matter, and fluxed like other metallic calxes, it will be reduced to a ſemi-metal, called by Mr. Brandt, of the Swediſh academy, who firſt produced it, *regulus of cobalt*. This regulus, and alſo the calx of cobalt, amongſt other ſingular properties, makes ſympathetic ink, by being diſſolved in aqua regia. This ink may be applied to the drawing of landſcapes, in which the ground and trees are deſtitute of verdure, being firſt drawn with Indian ink, giving an appearance of winter; but thoſe parts covered with this preparation, reſemble the ſpring, on being expoſed to a gentle heat, when the green leaves appear on the trees, and the graſs in the fields, which idea has been executed in France by an ingenious artiſt on a fire-ſcreen; and as a ſolution of regulus of cobalt, or of zaffre, in ſpirits of wine, acquires a reddiſh colour by application of heat, more variety may ſtill be introduced in the landſcape, and fruits and flowers ſuddenly brought out by the red ſolution, at the ſame time that the leaves and verdure appeared with the green.—Dict. of chemiſtry.

LETTER XXIV.

Obſervations on alum, with ſome account of an alum mine near the town of Alcaniz, in the kingdom of Aragon.

THE method of refining alum, ſeems at preſent to be totally neglected in Spain, though they have accounts of ſuch works having been formerly carried on, particularly near Carthagena, of which nothing remains but the name of the village, which is *Alumbre*, the Spaniſh word for alum; but, ſuppoſing them to have been once acquainted with this proceſs, they have now entirely loſt it; and notwithſtanding they have ſo rich a mine of it in the kingdom of Aragon, near the town of Alcaniz, belonging to the knights of Calatrava; yet the people of the country content themſelves with digging it out of the earth, and ſelling it to the French in its primitive ſtate, who refine it, and then ſend it back to the Spaniards, to be ſold to the dyers at a conſiderable profit.

Chemiſts know very well, that the vitriolic acid is diſperſed in moſt bodies all over the world, and is extracted out of many of them for ſale, particularly from ſulphur. Every body knows, that,

alum

alum is a cryſtallizable ſalt, compoſed of vitriolic acid, united with a white argillaceous earth, which many have taken for the reſiduum of burned plants, and in ſupport of their opinion, mention Italy, as an inſtance, where the moſt alum is found; being a country formed by volcanos, as appears from the number of its calcined ſtones, ſulphurs, pumice, and lavas, and thus attribute the origin of alum to fire, like that of ſal-ammoniac: without adopting or refuting any particular ſyſtems, I ſhall only add, that the alum of Alcaniz, is found in a low ſwampy and blackiſh ſoil.

The argillaceous earth, of which alum conſiſts, is weakly united to the vitriolic acid, for the ſalt of tartar, liquid, or ſolid, volatile alkali, ſalt of ſoda, calcareous earth, &c. diſſolved in water with alum, eject the clay from the vitriolic acid, and ſubſtitute themſelves in their lieu, forming new ſalts, more cryſtalline, whiter, harder, and drier, than alum itſelf, but experience teaches, that they are of no uſe in the dye-houſe, as the clay only, has the power of fixing the colouring particles, and giving them that brilliancy ſo pleaſing to the eye; for when it is mixed with any of the other above-mentioned matters, the water grows turbid, the clay precipitates, and becomes viſible, the other foreign earth taking its place; for which reaſon, the purer the alum, and the leſs impregnated with other

other bodies, it is the more proper for the dyer, and renders the colour more gloſſy and lively.

The alum of Aragon has the advantage of being entirely free from any foreign matter; conſequently is the beſt for every purpoſe, ſuperior even to that of Rome, and only requires to be cleanſed from caſual impurities. Its ſalt is found already formed, in the earth like nitre, and other common ſalts, in the nitreous and calcareous earths of Spain; nothing more being neceſſary to refine it, than a ſimple lixivation, to filter, and clear it from the impurities of the earth.

This lixivium is put into boilers, and evaporated over the fire, till a thin ſcum appears on its ſurface, like a cobweb; the liquor is then run off into other veſſels, where, as it cools, it cryſtalliſes into larger or ſmall maſſes, the form being of no manner of conſequence.

After this is performed, to ſave the ſalt ſtill diſſolved in the remaining liquor, they ſprinkle this liquor over the earth, prepared for the lixivium, by which means, none of the alum is loſt. Perhaps if the earth which has gone through this proceſs, was to be heaped up, in the ſame manner as that, out of which they get ſaltpetre, it might again produce a freſh ſtock of alum, by ſome interior labour of nature, with the aſſiſtance of water,

water, and air, for the kingdom of Aragon abounds with nitrous ſoil, from whence they get excellent ſaltpetre, as is evident by the gunpowder of Villa Feliche, the moſt famous in Spain. If any of theſe workmen would ſet about making experiments in this manner, with alumineous earth, ſhould it happen to ſucceed, it would be of great ſervice to the people of Alcaniz, who are at preſent in a ſtarving condition. I ſhall not enter further into the properties of alum, which have been fully deſcribed, by chemical writers, particularly Mr. Maquer, in a memoir read at the academy of ſciences in 1762, and ſuch as are deſirous to be fully informed of the nature of theſe works, will find in the memoirs of the French academy of ſciences, for 1750, a deſcription of the famous alum works of Solfatara, in the kingdom of Naples, by the Abbe Nollet: thoſe of Toifa, near Civita-vecchia, in the Roman ſtate, have been accurately deſcribed by the Abbe Mazeas, in the fifth volume of memoirs of foreign members of the ſame academy. And with reſpect to the ſubject at large, Mr. Monet, in his treatiſe *De la alunation*, has collected every neceſſary information for a perfect knowledge of the ſubject: an object of conſequence to commercial people, and has always been attended to, by enlightened nations. England, Sweden, Flanders, and Italy, are the countries where alum is principally found;

to

to ſay nothing of its uſe in medicine, I ſhall only add, that it is ſo material an ingredient in commerce, for dying and colouring, that without its aſſiſtance, neither of theſe branches can be tolerably performed, it being as ſerviceable and neceſſary upon ſtuffs, as gum water and glutinous oil are in painting.

LETTER XXV.

Remarkable depoſitory of foſſil bones, ſeen near the village of Concud, in Aragon.

THE village of Concud is about a league diſtant from the city of Teruel, in the kingdom of Aragon, ſituated on a hill of calcareous rock, degenerated into hard earth; and though it now appears to be very uneven, it ſeems to have been formerly rock which the rains have deſtroyed by degrees, in proportion to its greater or leſs reſiſtance. Going out of the village of Concud, towards the North, you aſcend three ſmall hills, and then come to the *Cueba Rubia*, "The Red Cave," ſo called from a ſpecies of red earth, which the waters of a gully have laid open. This hill is about two hundred paces long, thirty broad, and eighty in depth. The top of the hill is of calcareous rock, more or leſs hard, in ſtrata, of two

two or three feet breadth, full of terreſtrial and aquatic ſhells, which appear to be calcined. In the centre of the ſame rocks, there are bones of oxen and horſes, aſſes teeth, and other bones of leſſer domeſtic animals. Many of theſe bones ſeem preſerved in the ſame ſtate as thoſe found in cemeteries; others ſeem calcined; ſome are ſolid; and other ſorts are pulverized. The thigh and ſhin bones of the human race are ſeen with their cavities full of a cryſtalline matter. The horns of cattle are mixed with theſe, and other bones of different articulations, white, yellow, and black, confuſedly jumbled together, in ſome places there being ſeven or eight ſhin bones of men, without the leaſt regularity or order.

Theſe bones are generally found in a bed of rock about three feet thick, decompoſed, and almoſt converted into earth, with a ſtrata of ſuperincumbent ſtone, from fifteen to twenty feet thick, which ſerves as a cover to the hill, the bed which contains the bones, reſts upon a maſs of red earth, and rounded lime ſtone congl utinated with ſand not unlike pudding-ſtone. A ſimilar congeries is ſeen at the bottom of the gully, and the adjacent hills are of plaſter-ſtone. On the other ſide of the gully, and near it, there is a cave blackened by the fires of ſhepherds, where there are bones, in a bed of hard earth, above ſixty feet high, covered with different ſtrata of rock, correſponding exactly with

with thoſe on the other ſide; which ſhews that, what may have been carried away by the waters, was exactly the ſame as the maſs that remains. The chain of hills at this place, five leagues from Abbarracin, and eight from the ſource of the Tagus, produces the thorny reſtharrow *, two ſpecies of wormwood, two of ſantoline, ſouthernwood, French lavender, eryngo, ſage, and thyme, and wherever they dig, bones, as well as aquatic and terreſtrial ſhells, are found, in maſſes of hard rock, four feet broad, and eight long; ſome firmly fixed and rivetted therein, with ſo hard and ſmooth a grain, as to admit poliſhing like marble. At a muſket ſhot from the gully, there is a hill of rock, which is crumbling into earth, where an infinite number of bones and teeth is found, at two feet depth, but no further. In ſome places, the oſſified ſubſtance is entirely decayed,

* Ononis ſpinoſa. Linn. Thorny reſtharrow. Notwithſtanding Linnæus makes the thorny reſtharrow only a variety of the other, and, from the obſervations of Læfling, in the Flora Pruſſiea, ſays it becomes thorny in the autumn; yet with us they ſeem to be a different ſpecies; they are ſeldom found together, and the corn reſtharrow, without thorns, hath never been obſerved to become thorny. The ſmooth ſort is ſometimes pickled as ſamphire. A decoction of the roots has been recommended in caſes of ſtone and jaundice.—Dr. Withering's botanical arrangement, vol. 2d, page 444.

ed, nothing remaining but the impreſſion of the bones on the ſtone, in the ſame manner as it frequently happens with ſhells. The finding of theſe bones in hard rocks, and of ſuch different gradations or converſions into earth, of various ſorts, and colours, all diſpoſed in regular ſtrata, indicates a decompoſition and recompoſition, ſo that the hills in reality conſiſt only of two beds, one of limeſtone, divided into different ſtrata, and the other of ſmall rounded ſtone, conſolidated with ſand and calcareous earth. In this latter part there are no bones, nor ſhells, which are only to be found in the firſt diviſion, the variety of colours being purely accidental.

It is as ſingular to find ſhells, not petrified, in theſe rocks, as to meet with them, petrified, or the impreſſions of them, near Teruel; but it is ſtill more ſurpriſing to find rocks almoſt entirely compoſed of aquatic and terreſtrial ſhells, confuſedly huddled together, and mixed with ſmall bones, in a thin bed of blackiſh earth, beneath other beds of rock, and yet not to meet with ſuch bones in any other part, either higher or lower, ſometimes above fifty feet deep.

They tell you of an entire ſkeleton having been diſcovered, but this is much to be doubted, for though many bones are white, and well preſerved, none are found that correſpond, or belong to each

other, in that whole range of extenſive oſſification. Theſe bones muſt have been ſeparated from their reſpective parts, by ſome accident difficult to be accounted for at preſent: according to their actual poſition one would imagine them to have been conveyed there, by ſome fluid, either water, or mud: ſome ſeem to have ſlided horizontally from thirty, to ſixty feet, which deſtroys all ideas of an earthquake; others have ſtuck faſt in a bed of mud, about two feet from the ſurface, which by degrees has hardened in the air, others have remained on the ſurface, and turned into limeſtone; finally, many fragments of bones and ſhells mixed in this mud, have dried up, and become the moſt conſiderable part of the rock.

For many leagues round, the rocks are merely ſuperficial, having always underneath, either ſoft earth, gypſeous, or detached ſtones, cemented with other matter, which accounts for the facility, with which the waters form ſo many gullies, and little flat hills, as are ſeen in different parts of this country. It is probable however, that thoſe beds of earth were not ſo ſoft formerly, otherwiſe the waters would have made greater ravages, than they actually have done; though at preſent the deſtruction is great: there being many living witneſſes, who recollect the aſtoniſhing progreſs of ſome of theſe gullies, as well as the commence-

ment

ment of others, which at preſent are ſmall, but, may one day acquire a conſiderable depth *.

Objections perhaps may be ſtarted, to what has been offered, relating to the decompoſition and recompoſition of matter, and ſome may even alledge, that ſuch bodies were always one, and the ſame, which is contrary to experience, and ocular demonſtration. In ſuch caſe, they would find

* Theſe rocks at Concud ſeem to contain bones ſimilar to thoſe, found in the rock of Gibraltar, large pieces of which being examined by the beſt anatomiſts in England, no human bones were diſcovered, and they were ſuppoſed to be bones of ſheep; many of them were filled with cryſtallized matter. It would be an object of no ſmall curioſity to aſcertain, if poſſible, what animals theſe bones of Concud did once belong to.

Some large bones, ſuppoſed to be of elephants, were found in 1778, upon throwing up the new road near the gate of Toledo, at Madrid, and an account of them was inſerted in their gazette; they are now placed in the royal cabinet of natural hiſtory at Madrid.

See a curious account of ſome foſſil bones diſcovered in the iſlands of Cherſo, and Oſero, by the abate Fortis, in his travels into Dalmatia, tranſlated from the Italian. London, 1778, 4to.

Dr. Meſny, phyſician to the military hoſpital at Florence, has lately publiſhed a treatiſe on ſome bones found on the banks of the Arno, in Tuſcany, which are thought to be the bones of an elephant, or ſome unknown animal. The Doctor told me, when I was at Florence in 1777, that they pretended to have found the ſkeleton of an elephant entire.

themſelves obliged to allow that minerals, ſpars, cryſtals, &c. do not form anew, and that there is no ſuch event in nature, as decompoſition and recompoſition: A principal not to be ſupported by any ſound arguments. We need only open our eyes, and examine thoſe enormous oyſter ſhells, ſeen on the ſurface of the earth, between Murcia and Mula, where the ſoil evidently appears, to be formed by the reduction of lime rock, into calcareous earth, theſe ſhells having faſtened themſelves there, when that matter was in a muddy or diſſolved ſtate, and become afterwards calcareous earth; it being evident, they were not always in the ſtate they are in at preſent. Let us then ſuppoſe, this earth to have hardened in the courſe of time, which is not improbable, and to form rock or granite; who will deny, that a decompoſition, and recompoſition muſt have happened? It is not poſſible indeed to produce witneſſes of the fact, becauſe the life of man is too ſhort, and the information received from our predeceſſors, too defective for that purpoſe; to which may be added the ſlow and incomprehenſible progreſs of nature, imperceptible to human obſervation. We are are therefore ſtill very much in the dark, relating to theſe bones, as well as, with reſpect to our knowledge of foſſil ſubſtances in general; having yet to aſcertain, a more accurate diſcovery, of

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their former natural ſituation, as well as the true origin of the mountains, and ſtrata of earth in which they are found *.

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* "Philoſophers, antient and modern, (ſays a late writer) have hitherto conſidered mountains, in general, from a point of view, too confined, or entirely different from that of mineralogy and mining; being unimproved by the light of volcanos, and by that extenſive knowledge, which they might have reaped, in the deepeſt mines, or on the higheſt mountains, and from the inſtruction of unſcientific miners, they ſtuck only to their libraries, and to the uppermoſt cruſt of the earth, which they had an opportunity of examining, without any great trouble to themſelves, in the moſt pleaſing countries, and in the moſt ſuperficial quarries of ſandſtone, limeſtone, and ſlate. We are not to wonder therefore, that orology, or the ſcience of mountains, is ſo little underſtood amongſt the learned, and that the deſcriptions of the higher mountains of Peru, Teneriffe, Switzerland, and different parts of Europe, are generally filled with meteorological obſervations, botany, and other accounts, which leave their very nature, in a mineralogical, and orological reſpect, full as unknown, as they were before. The conſequence was plain, that, general concluſions have been too raſhly drawn, from a ſingle kind of mountains, and that, the pretended ſyſtems, of the origin of mountains in general, are, for the greater part, ſo very romantic, and ſuperficial."—Travels through the Bannat of Temeſwar, Tranſylvania and Hungary, by Baron Inigo Born, tranſlated from the German, by R. E. Raſpe. London, 1777. See preface, page xxix.

END OF THE FIRST PART.

PART II.

LETTER I.

Don Guillermo Bowles's journey, by order of Government, to inſpect the mine of Almaden, in La Mancha, deſcribing his new method of extracting the quickſilver from the ore of that mine; with ſome account of the uſe made of quickſilver, by the Spaniards, in the ſilver mines of Mexico, and Peru.

IN the year 1752, I received orders, from the miniſtry, to inſpect the rich quickſilver mine, at Almaden, in La Mancha. Our firſt ſtage, from Madrid, was to Getafe, and from thence to Toledo. The waters of the Tagus are very good here, and mix well with ſoap, though they are bad at Aranjuez, on account of their union with limy and ſaline particles, in that part of the river. From Toledo I proceeded to Mora, through a well cultivated valley, and from thence to Conſuegra, paſſing forwards by the Puerto Lapiche, Daimiel, and Miguelturra, to the village of Carraſcal. Hitherto the country is well cultivated, but further on, the plains are filled with holm trees,

trees, privet, roſemary, ſouthern wood, and furze with white flowers, as far as Zarzuela, and from thence to Almaden, forty-one leagues to the weſtward of Madrid. Here the face of the country is totally altered, and now becomes mountainous.

The quickſilver mine of Almaden is the moſt curious and inſtructive, with reſpect to natural hiſtory, as well as the moſt antient we know of in the world. Theophraſtus, who lived 300 years before Chriſt, ſpeaks of the cinnabar of Spain; and Vitruvius, who lived under Auguſtus, mentions it likewiſe.

Pliny ſays, this mine was in the province of Bætica, as it really is, Almaden being the laſt village of La Mancha, and only divided by a brook, from the kingdom of Cordova. He further tells us, it was always locked up, by the governor of the province, and never opened, but by expreſs command of the Emperor; and when the quantity wanted for Rome was taken out, was inſtantly ſhut again; but ſince their dominion, every thing has been ſo altered, and overturned, that no traces are left of their labours.

The two brothers, Mark and Chriſtopher Fugger, of Augſburg, had a grant of this mine, and were to furniſh the king, yearly, with four thouſand five hundred quintals of mercury, but

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not being able to make good their engagements, or for ſome other reaſons, beſt known to themſelves, they gave it up in 1635, as well as the ſilver mine of Guadalcanal, which was likewiſe in their hands, yet theſe Germans made ſuch a fortune in Spain, as to leave great riches to their heirs, who now flouriſh in Germany, raiſed to the higheſt dignities, being counts of the ſacred Roman Empire, and poſſeſſed of conſiderable eſtates in the circle of Suabia; † their opulence was ſo conſpicuous as to become a proverbial expreſſion in Spain, *Ser rico como un Fucar*, "To be as rich as a Fugger," a ſimile we find in Don Quixote. There is a ſtreet of their name in Madrid.

The church, with great part of the village of Almaden, conſiſting of above three hundred houſes, ſtands upon cinnabar, and the inhabitants are chiefly ſupported by the profits of the mine, which lies in a hill of ſandy rock, forming two inclined planes, with a craggy rock on the ſummit, ſtudded

† The family of Fugger is deſcended from John Fugger, a citizen of Augſburg, in 1370, father of Jacob, who, from a merchant, roſe to be a counſellor to the Emperor. His ſons, Ulric and George, were made Barons of the ſacred Roman Empire, by the Emperor Maximilian, in 1504, and their deſcendants were afterwards raiſed to the exalted dignity of Counts of the Empire. They have immenſe property in the circle of Suabia, are divided into ſeveral branches, and allied to the greateſt houſes in Germany.

ſtudded with ſpecks of cinnabar, which, no doubt were the firſt tokens that led to the diſcovery of the mine. In other parts of the hill, ſmall beds of ſlate appear, with veins of iron which on the ſurface follow the direction of the hill. Some improperly call theſe ſuperficial veins, for there are ſuch in the adjacent hills, where no cinnabar was ever ſuſpected to exiſt, and all the country abounds in mines of iron; what is more, in the very mine of Almaden, pieces are ſometimes found, in which the iron, quickſilver, and ſulphur, are ſo mixed together, as not to form a different body. This deſtroys the common opinion, that iron amongſt metals, is the only one, indiſſoluble by mercury, the fallacy of which I have further experienced in the quickſilver mines of Hungary, where it is certain there is a mixture of iron ore, and I have ſeen in the quickſilver mines of the Palatinate, a great part of ironized mineral ſerve as a matrice to cinnabar.

The neighbouring hills are of a ſimilar kind of rock to that of Almaden, and furniſh the ſame ſorts of plants, which ſhews that cinnabar does not exhale thoſe poiſonous vapours ſome have imagined, nor are they obnoxious either to vegetation or mankind. A miner may ſleep in ſecurity on a ſtratum of cinnabar, and I have counted above forty ſorts of uſual plants that thrived and run to

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ſeed within the precincts of the twelve furnaces where the mineral is roaſted.

The felons who work there, feel no inconvenience from it, and do nothing more than wheel about the earth in barrows, yet many of them are ſo crafty, as to counterfeit paralytic and other complaints, to impoſe on the benevolent diſpoſition of thoſe, who viſit the mine. Each man coſts government eight reals per day, (about two ſhillings) they are better fed, than any labouring man, ſell half their allowance, and enjoy good health; yet from a principle of compaſſion, are only made to work three hours a day, and the public think their condition ſo infinitely wretched as to be little ſhort of death.

The very judges on the bench muſt be of that opinion, when they affix this puniſhment to the moſt atrocious crimes, yet they are deceived,* and may be aſſured, every labourer in Almaden does of his own free will double the work of theſe felons, and for half the profit.

In this mine, two veins, from two to fourteen feet broad, run the length of the hill, with branches ſhooting out into various directions. Every

* Mr. Bowles follows on this occaſion the opinion of Don Antonio de Ulloa, in contradiction to the experience of all ages.—See Dr. Robertſon's hiſtory of America, vol. 2d, note lxxxi.

ry one knows that the ſand-ſtone is compoſed of grains of different ſizes, the ſtone of the vein is the ſame as in other parts of the hill, and ſerves as a matrice for the cinnabar, which is more or leſs abundant in proportion to the fineneſs of the ſand ſtone, on which account ſome lumps of the vein will contain to the amount of ten ounces of quick-ſilver in the pound, and others only three.

The two principal veins are attended with thoſe upper and lower ſtrata of rock, generally obſerved in all veins, to which miners have given the names of the roof, and the floor. At Almaden they are of black and rotten ſlate, and I have occaſionally ſeen in them a quantity of cinnabar, and large round, or flat pyrites, yellow and ſulphurous, which, being broke with the hammer, exhibit within ſmall particles of cinnabar. The pyrites decompoſe and diſſolve, which occaſions that vitriolic moiſture which ſhews itſelf in yellow ſpots on the linen of thoſe who enter the mine; and as it comes out with lemon juice, it is evident they are martial pyrites. There was one of theſe in the King's former cabinet, that weighed ſixty pounds; I collected ſome of three pounds. Beſides pyrites they alſo find in the mine, pieces of white quartz, richly ramified with cinnabar, and light ſpar, ſometimes even cryſtalline, both filled with the ſame matter, either lamellated or in the form of rubies. There is alſo ſlate, full of them, and the chert,

or

or *hornſtein* of the Germans †, is ſtudded with cinnabar like nail heads: even pure and native mercury is ſeen in the crevices of ſlate and ſand-ſtone §.

From the beſt information I could get, the heirs of the Fuggers rented this mine till 1645, when the King took it into his own hands, and the German miners

† Chert. *Petroſilex. Lapis corneus.* Cronſted, ſect. LXIII.

§ Though native cinnabar has ever ſo lively and red a colour, it has always a mixture of argillaceous, or calcareous earth, or of ſand; and theſe ſubſtances are frequently impregnated with an arſenical taint. Even mercury, though with ſo pure an appearance, may yet be loaded with a pernicious vapour; for which reaſon, I think that native cinnabar ſhould be baniſhed from the ſhops. At the foot of a ſteep mountain, near San Felipe, in Valencia, I made excavations, and at the depth of twenty-two feet, found a hard, white, calcareous earth, containing drops of fluid mercury. This earth, being waſhed, in a neighbouring fountain, left twenty-five pounds of pure mercury, which was ſent to Madrid, and depoſited in the royal cabinet of natural hiſtory. A little above the ſpot where the mercury was found, there were petrifactions and gypſum. From exact reſearches, we know that a bed of cinereous clay, two feet below the ſurface, extends the length of the city of Valencia, from Eaſt to Weſt, replete with drops of mercury, which were diſcovered after repeated experiments in digging of wells; particularly in the houſe of the Marquis of Doſaguas. Thus we found it in a white calcareous earth, with petrifactions, at San Felipe, and behold it in the city of Valencia, in a cinereous clay, without them!

miners were diſmiſſed. The next year the crown allotted forty-five thouſand trees to ſupport the galleries of the mine, but the workmen reaped no advantage from it, the timber having been employed without art or ingenuity. The ſame year Don Juan Alonzo de Buſtamante eſtabliſhed the reverbatory furnaces with alludels, the Germans having only uſed retorts, of which many fragments are ſtill to be ſeen amongſt the rubbiſh.

The direction of the hill of Almaden is from north eaſt to ſouth weſt, having about 120 feet elevation. I went its whole length in four and twenty minutes, and its breadth in fourteen. Like moſt of the hills in La Mancha, it is compoſed of two plains, whoſe ſummit forms a peak of craggy rock, but the upper part has not that perpendicular elevation it ſeems to repreſent, for it forms an inclined angle of fourteen degrees, and all the ſmaller rocks of the hill have more or leſs the ſame inclination. We ſhall next ſee, that a due obſervation of theſe circumſtances, conſtitutes a principal branch of the art of mining.

The ſtone on theſe hills, as well as on the ſuperfices, as in the centre, is of the ſame nature as that of Fontainbleau, and the pavement of Paris: on calcining it, and examining it minutely, when it comes out of the furnace, the grains of ſand are found to be of the ſame ſhape and tranſparency with

with thoſe on the ſea ſhore. The enormous pieces of rock which compoſe the internal part of the mountain, are cut with vertical fiſſures, and though the rocks ſeem to have an erect poſition one over the other, the length of the hill, this is not the caſe, for they all incline to the ſouth.

Two veins more or leſs impregnated with cinnabar, cut the hill almoſt vertically, and form thoſe ſtrata which we have ſaid were from two to fourteen feet broad; theſe unite on the moſt convex part of the hill, ſtretching as far as one hundred feet, from which happy union aroſe that prodigious richneſs of mineral called *del Roſario*, which has given many millions of quintals of quick-ſilver, and was in my time the occaſion of that diſmal fire in the mine.

A bed of rock two or three feet broad, runs from north to ſouth, acroſs the hill, and cuts the two veins, ſo that further on, there is no appearance of cinnabar. This kind of rock being prior to the forming of the ore, ſtops the mineral vein, which finding it ſo hard, cannot penetrate that way, and is obliged to turn out of its direct courſe. It is from this rock to the other extremity of the mine, that I ſaid I went in fourteen minutes. If the veins ran without interruption, and always on a ſtraight line of the ſame breadth, leſs trouble and art would be neceſſary in the working of mines.

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Let us now ſpeak of the method of working theſe of Almaden before my arrival there.

Theminers had never ſunk their ſhafts according to the inclination of the vein, but had made them perpendicular, letting themſelves down by pullies in buckets, from which awkward contrivance aroſe all the miſchiefs that followed, for in proportion as they went deeper, they often loſt the vein, and were obliged to open a new ſhaft with the ſame inconveniences, and thus went on, continually encreaſing their ſhafts and galleries with ſimilar defects, by which they not only loſt a great deal of labour and time, but were deprived of a free circulation of air underneath, as that which ruſhed in at one part, immediately made its eſcape at the other, next to it, and the people were ſuffocated below; the ſame would have happened in a ſtone quarry, as well as in a mine: moreover, the great number of galleries, filled with quantities of decayed and rotten timber, produced obnoxious vapours, and made a hanging vault of the mine, replete with danger, from the large pieces which continually tumbled in; to prevent theſe inconveniencies in future, I laid before the miniſtry the following propoſals.

That a new mine ſhould be opened lower down, and a general ſhaft ſunk obliquely, following the direction of the vein, and leaving a ſtaircaſe at every

every twenty feet, to go up and down. That two galleries ſhould be extended on the vein, one to the right, and the other to the left, continuing them in proportion as the ſhaft went deeper. That a ſpace of three feet ſhould be left on the vein, between one miner and another, in the nature of ſteps which the French call *travailler en banquette*. By this means a file of workmen, from twenty to a hundred, might be placed commodiouſly, and go as deep as they pleaſed without danger, becauſe the new excavations are ſupported with the ſtone and rubbiſh dug out of the mine, the props which ſerve for this purpoſe being ſolid, and not liable to the ſame inconveniencies as timber.

The ſame ſhould be done in the ſecond vein, and they might continue their labours at pleaſure; when they go deeper, a gallery for a communication of air, muſt be made from one vein to another, by which a conſtant circulation is kept up through the whole, as is always practiſed in well regulated mines.

My plan was well received by the miniſtry, miners were ſent for from Germany, and the whole was tolerably executed. About this time the Cinnabar mine of Guancavelica, in Peru, had begun to decay, after ſupplying the mines of that kingdom for above two centuries paſt with a pro-

digious quantity of quickſilver *, that of Almaden only furniſhing Mexico, for which purpoſe they generally extracted five or ſix thouſand quintals per annum, but the miniſtry finding it was neceſſary to ſend more to Peru, ordered a large quantity to be provided, ſo that from Almaden, and Almadenejos, they extracted about eighteen thouſand quintals per annum, but the greateſt part came from the mine worked by the Germans.

The Fuggers were the moſt experienced men of their age, and their ſhafts and galleries were according to the ſtricteſt rules of art; but they never undertook any thing very great, perhaps only conſidering themſelves as occaſional tenants, therefore endeavoured to get as much as they could at the cheapeſt and eaſieſt rate, concluding their harveſt would be ſhort. They appear to have directed their views where the ore was richeſt, which they ſoon after quitted, to go upon others, for we find above ſix hundred galleries of theirs, propped by timber, as a temporary ſupport, which they knew could not laſt.

Let us now ſpeak of thoſe furnaces invented by Buſtamante, ſo perfect that no alteration has been thought neceſſary to be made in them to this day. The

* The mine of Guancavelica was firſt diſcovered in 1563. See Noticias Americanas. Entretenimunto phyſico hiſtorico por Don Ant. de Ulloa. Madrid, 1772, 4to.

The form of the furnace is ſimilar to that of a good lime kiln *, only that the chimney is placed on the anterior wall, that the flame may ſpread itſelf equally every where. On the lower part of the furnace, they firſt lay a ſtratum of the pooreſt ſort of ſtone, containing the leaſt mineral ſubſtance, over this a better ſort, with the ſweepings and droſs, in which they ſuſpect there might be ſome mercury, to which they add water, making it into a paſte, and laying it on the top. Then, a little lower down, they ſet fire to the furnace, with faggots of terebinthinus, lentiſcus, cyſtus, roſemary, and other ſhrubs which abound in the neighbourhood. The upper part of the furnace is covered with earth, leaving eight apertures of ſix inches diameter, where a file of eight aludels are placed, properly luted in an inclined poſition, and terminating at a ſquare chamber, where the quick-ſilver is received. The fire penetrates the ſtone, and heats the ſulphur, by which means the mer-

* In the memoirs of the academy of ſciences of Paris for 1719, there is a cirumſtantial account of theſe furnaces, by the celebrated Bernard Juſſieu, and it will not be amiſs to conſult the *Dictionaire des arts & metiers, par Jaubert.* Mr. Bowles, in his dedication to the king, ſays, that the mine at Almaden had been rendered uſeleſs by a conflagration till he put it in repair, which fixed him in the ſervice of that crown, and afforded him the opportunity of viſiting ſo many parts of the kingdom.

cury dilates; and as both are ſo volatile, they eſcape together, through the aludels; but the ſulphur, being more penetrating, exhales in the chamber, and even works into the aludels, and the compoſition with which they are luted, while the mercury, from its weight, condenſes, and in its paſſage cools, when it falls into the tub placed to receive it. From hence it follows, that if the furnace is good, all the quickſilver in the ſtone, muſt be found in theſe tubs, there being only this objection againſt it, that the fire is not active enough, to burn all the ſulphur, rarify the mercury, or extract it out of the ſtone; or, that the fire, being too violent, does not allow time for the metal to condenſe, but hurries it, united with the ſulphur, ſo that it eſcapes from the aludels. To try whether either of theſe inconveniencies happened, I made the following experiments, before the governor, and ſeveral other perſons of rank.

I cauſed ſome pounds of ſtone, burned in the furnace, to be pulverized, and then mixed them with the nitre and charcoal, then fired them, covering them with a veſſel, previouſly wetted with water, to receive the vapour. As nitre, and charcoal united, burn with extraordinary violence, it is evident, that if, in this mixture, there had been the leaſt grain of quickſilver, it would neceſſarily

ceſſarily rarify and condenſe againſt the ſides of the moiſtened veſſel. In effect, we did obſerve ſome mercury there, but in ſo ſmall a degree, that it was hardly perceptible with a lens, and of courſe of no conſequence; for in every fuſion of ores, ſome minute particles will eſcape in the ſcoria.

To diſcover if any grains of mercury were loſt in the air, I placed four large copper veſſels, not tinned, in four different places, one on the eight inches of earth, which covered the furnace, whoſe aperture is about three feet and a half diameter, others on the firſt aludels, which are the hotteſt, another at the obtuſe angle of the ſame, where the mercury condenſes, and the other at the higheſt part of the chimney, in the chamber, where the aludels lead to; as it is known, with what quickneſs mercury unites to all metals, except iron, if it exhaled at any of theſe places, where the copper veſſels were fixed, it would have appeared on the copper, for I left them there above twelve hours, at the expiration of which, not the leaſt particle of mercury appeared.

In the precincts of Almaden, there are twelve furnaces, called The Twelve Apoſtles; each can receive about 200 quintals, including good and bad ſtone, which in three days will produce about 40 quintals of quickſilver. Three days more are required

required to repair the furnace, and replace every thing properly, ſo that four out of the twelve, are always in action, the violent heats of the ſummer excepted, when a ſuſpenſion from labour is unavoidable.

When we reflect on the advantages of theſe furnaces, they muſt be conſidered as objects of the greateſt utility and honour to Spain, foreigners having likewiſe improved from them. The Hungarians have imitated them in their mines, by which they have conſiderably reduced the number of workmen, employed in the old method, with retorts. Foreigners are ſhewn every thing without reſerve,* and are permitted to examine the rocks

* Mr. Ferber, in his travels through Italy, ſpeaking of the quickſilver mines of Idria, in Friul, belonging to the houſe of Auſtria, ſays, "They conſider here their common melting and uſtulation of the mercurial ores, as an arcanum, and accordingly do not allow any ſtranger to examine their ſublimation houſe, though even its exterior form undoubtedly, and at firſt ſight, proves their method being the very ſame as that which is uſed at Almaden, in Spain, and has been very minutely deſcribed by Mr. Juſſieu, in the memoirs of the French academy; this method is far from being perfect, and above any improvements, but probably they do not think ſo, elſe there could be no poſſible reaſon for this myſtery in ſo common a manipulation: nothing is more oppoſite to the progreſs of ſcience, and even to the intereſt of ſtates, than ſo ſingular a reſerve." Travels through Italy in 1771 and 1772, by John James Ferber. London, 1776.

rocks at their leiſure, and even make drafts of the furnaces, and ſee their method of packing-up the quickſilver in goat-ſkins, which is certainly the beſt policy, to facilitate the operations of a mineral that, perhaps, one day or other we may be in want of ourſelves.

Let us enquire into the five or ſix thouſand quintals of quickſilver, ſent yearly from this place to the Mexican mines; though my account ſhould not be entirely exact, it will come as near as is neceſſary in points of this nature. Many of the mines of New Spain are worked by fuſion, but where fuel is ſcarce, or the ore very poor, they amalgamate it with quickſilver; it muſt be allowed the Spaniards were the firſt who undertook this proceſs in 1566; it is true, it was in uſe in the gold mines of Hungary, but this had no connexion with the works of the Spaniards, becauſe in Hungary, the ore either appears to the naked eye, or is perceived with a lens, and as every body knows that quickſilver mingles with gold, it was natural to ſuppoſe, it could be extracted by this method; but none before the Spaniards ever thought of mixing quickſilver with a ſtone, containing inviſible ſilver, diſſolved with ſulphur, and arſenic, and oftentimes mixed with copper, lead, and iron. They therefore diſcovered an ingenious mode of reducing a poor ore to an impalpable powder, and to form a maſs of about twenty-five quintals, mixing

mixing it afterwards with ſalt, or green copperas, and with lime, or aſhes, reduced to a fine powder.

Theſe bodies, however, being of a different nature, would remain in perpetual reſt, without a diſſolvent to put them in action, for which purpoſe, they are ſufficiently ſprinkled with water, throwing in thirty quintals of mercury, at different times, taking care to ſtir it about conſtantly, for the ſpace of two months. The fixed alkali of the aſhes, and lime, diſſolved by this means, works in the acid of the ſalts and copperas, which inteſtine action cauſes a violent efferveſcence and heat, by which means the ſulphur, and arſenic, abſolutely diſſolve, and deſtroy the copper, lead, and iron. Then the imperceptible atoms of ſilver, eſcape from their confinement, are collected by the quickſilver, which amalgamates with them, and form that ſubſtance or paſte the Mexicans call *pina*. *

By

* The moſt perfect ſilver extracted from the ore at the mines is in that form, which the Spaniards call *pinnas*, which is a lump of ſilver extremely porous, becauſe it is the remainder of a paſte made up of ſilver duſt and mercury, and the latter being exhaled, leaves this remainder of the maſs, ſpungy, full of holes, and light. It is this kind of ſilver that is put into different forms by the merchants, in order to cheat the king of his duty, &c.—See the proceſs of the ore from the mine to this kind of cake or maſs.—" Voyage to Peru, performed by the ſhip *Conde* of St. Malo." Written by the chaplain. London, 1759.

By this proceſs they collect one and a half, or two ounces of ſilver from every quintal of ore, from which, according to the method practiſed in Europe, they would not defray workmen's wages.

I cannot aſcertain with preciſion the quantity of mercury loſt in this operation, as the accounts of miners are ſo varied and incorrect on this head; the moſt probable conjecture, is, that they loſe as many ounces of mercury, as they obtain ounces of ſilver, ſo that an ounce of mercury delivered at Mexico, becomes nearly of the ſame value as an ounce of ſilver. †

LETTER

† The 18000 quintals of mercury, mentioned above, are diſpoſed of in the following manner; 12000 ſent to Mexico and New Spain, 2000 to Guatimala, and 4000 to Lima; Peru furniſhed the remainder from its own mine of Guancavelica. According to Barba, who was pariſh prieſt of Potoſi, in 1637, mercury was firſt uſed in the mines in 1574, and down to his time, the royal office had received 204700 quintals of mercury, excluſive of the great clandeſtine import. Eſcalona in another work, declares that before 1638, it appeared by the public accounts, that the produce of the ſilver amounted to 395.600.000 peſos, which in 93 years, the time it had been diſcovered, amounts to 41.255.045 peſos per annum; from whence may be conceived the wealth of the mountain, and though it has not of late been ſo productive as formerly, yet it is ſtill very conſiderable.—See "Voyage to South America, undertaken by command of the king of Spain, by Don George Juan

LETTER II.

Itinerary of Don Guillermo Bowles, continued, from Almaden to the city of Merida, in Eſtremadura.

INTENDING to make a tour into Eſtremadura, I ſet out from Almaden towards the north weſt, as far as Zarzuela, then, inſtead of continuing the road to Madrid, I went to the weſtward, croſſing a chain of hills which divide La Mancha from Eſtremadura. Theſe hills are covered with roſemary four or five feet high, privet, ſeveral ſorts

Juan and Don Ant. de Ulloa, tranſlated from the Spaniſh." London, 1758.

The following is an account of the Spaniſh mints in America, as they ſtood in 1777.

Mexico coins annually, about -	18.000.000 peſos.
Lima - - -	9.000.000
Santiago de Chili, *chiefly gold* -	8.000.000
Popayan and Santa Fe together -	12.000 000
Guatimala - -	2.000.000
Potoſi - - -	10.000.000
Sonora in California. New mint eſtabliſhed in 1778, uncertain - - - - - - -	
	59.000.000 peſos.

Fifty-nine millions of peſos, at 4*s.* 6*d.* each, - £.13.775.000 ſterling per annum.

ſorts of the ciſtus with lavender leaves, elm leaves, roſemary leaves, and two other ſpecies: Alſo a great deal of lavender, thyme, and dwarf ciſtus, and though the ciſtus is of no uſe to the bees, they draw ſo rich a ſtore from the other plants with which the country abounds, that hives are numerous every where in theſe parts. From theſe hills you deſcend to the village of Guabaguela, where the good paſture begins for the Merino ſheep, the graſs being plentiful and fine. The hills are chiefly covered with oaks, which become hollow by the imprudent manner in which the branches have been lopped; however they produce abundance of acorns for the ſwine, which are all black hereabouts. The principal revenue of the country gentlemen, conſiſts in paſture, honey and wax. They have ſtuds of brood mares, and a breed of cows, which all over Eſtremadura are whitiſh or red. It is ſeven leagues from Guabaguela to Alcocer, over an uneven ground, watered by a great many ſprings. You next come to Tallarubia, whoſe diſtrict is level, and proper for paſture. The rocks of ſand or quartz are ſeen no more, but many looſe pieces of each lie ſcattered on the ſurface of the ground; the rocks have perpendicular laminated fiſſures, ſome thin, others thick, which ſeem to demonſtrate their ſucceſſive decompoſition into arable land, and the ſame happens with the quartz rocks

on

on the hills. The ſlaty rock is compoſed of argillaceous earth, and fine ſand, and from them, when they decompoſe, comes that fine ſand ſeen in the brooks, and on the ſides of the road, the water carrying away all the argillaceous earth, which does not cling faſt to the roots of ſhrubs, or trees. Some rocks hereabouts, are apparently as hard as the Egyptian Baſaltes, and of the ſame colour, and nature; nevertheleſs they moulder away like the reſt, and turn into earth. In the midſt of this vitrifiable country, the calcareous ſtone begins to form itſelf, and is ſeen diſperſed up and down, on the ſurface, like patches.

The paſtures called *Debeſas de la Serena*, are contiguous, being a depopulated diſtrict of nine leagues extent, reaching to the village of Coronada, conſiſting of a plain without either trees or plants. At the end of this diſtrict, there are rocks of white quartz, veined with a pale red; alſo a great many oaks and wild olive trees, as well as that ſpecies of crowfoot, called *ranunculus ficaria* by Linnæus, whoſe roots are like barley corns, and from their reſemblance to external hemorrhoides, fanciful people have imagined they had the virtue of curing them.

From Coronada, it is a journey of three hours to Villanueva de la Serena, from whence an extenſive plain, entirely of ſand, reaches to the village

lage of Don Benito, nevertheleſs fertile in corn, vines, pears, figs, &c. owing to the proximity of the water, as appears from the quantities of ruſhes ſpringing up every where; for, though the ſurface is covered with a looſe ſand, for two or three feet, there is a bed of a more firm and compact ſort underneath, which ſupports the water, without the aſſiſtance of clay, hard earth, or rock, to impede its filtration; ſo that this ſoil will often produce thirty for one; it being enough to plant a branch of a fig-tree, or a ſtake of an olive, for it ſoon to take root, and give fruit; yet, notwithſtanding all theſe advantages, great part of the country lies waſte, as far as Medellin, on the banks of the Guadiana, whoſe houſes are ſmall, and only of one ſtory. In the centre of Medellin, they ſhewed me an humble manſion, though worthy of notice, as having been the native place of the illuſtrious Hernan Cortez, the great conqueror of the Mexican Empire. The lintel of the door, is of granite, ſimilar to that of the Eſcurial, *a ſmall cage indeed, for ſo conſiderable a bird!* ſaid a biſhop of Badajoz, on viewing this building.

From Villanueva I came, in four hours, to the village of San Pedro, croſſing part of a ſandy plain, but except what is cultivated, by the inhabitants of Don Benito, all the reſt is neglected, and only ſerves for paſture, the water being at a greater

greater diſtance. This diſtrict is called Torre Campos, and extends four ſquare leagues, to the village of San Pedro, amidſt hills, covered with oak, gum ciſtus, lavender, and white aſparagus; from hence it is three hours journey to the city of Merida, deſcending, after the firſt league, into a well cultivated country, traverſed by ſeveral brooks, that empty themſelves into the Guadiana, whoſe beds are dry in the ſummer, as well as this great river itſelf, in many places; for, as it meanders ſo much in the plains, the ſands ſoak up its water, which, by degrees, eats away the hills, converting the granite, ſandſtone, and rock, into ſand; ſo that the coarſe ſand, the fine, and the pebble, are ſeen, decompoſed, in the valley, in the ſame order they were ranged on the hills, from whence they have inſenſibly rolled down. Thus, for example, if, on the eminence, there was a quarter of a league of granite, the ſame proportion will be found in the valley, of pebble; if ſandy rock, then coarſe ſand; and, if ſolid rock, then fine ſand, and, at times, all blended together, from their having been ſo in their former poſition.

Merida, from its venerable remains, and antiquities, juſtly deſerves the attention of the curious. What is now left of this antient city, is on a ſmall hill, occupying about the circuit of a league, on the banks of the Guadiana, but its ruins extend much further,

further, and ſhew it to have been the principal colony of the Romans, in Spain.

Examining the remnants of ſtone, ſcattered amongſt the ruins, I found a great variety of colours, mixtures, hardneſs, and qualities. To be the better acquainted with their nature, I attentively obſerved the adjacent hills, and plains, from whence they were moſt probably dug out; from theſe reſearches, I deduced four primitive ſorts, which, by various mixtures, conſtitute the great variety obſerved here. The firſt is of a deep red, like bulls blood, and ſometimes as brown as chocolate, with a ſmooth grain; this is the mother of Porphyry; the ſecond is white, and without any grain; the third is of a blueiſh caſt, tending to black, and the fourth inclining to green; all theſe primitive kinds, when conſidered ſingly, are of very little value, from the dullneſs of their tints, the white excepted; but, when blended together, have a pleaſing effect. The white united with the porphyry, conſtitutes an anomalous ſtone, which cannot be claſſed with any of thoſe deſcribed, either by the antients or moderns. Pieces of it are found on the ſurface of the ground, of twenty pound weight, and it is probable there are conſiderable beds of it underneath; for, naturally, the antients dug out the beſt, and where it was eaſieſt to be got. The mother of porphyry, appro-

appropriated to itſelf in its primitive ſtate, divers fragments of white quartz, from the ſize of a hazle nut to that of a cheſtnut, which occaſions thoſe various ſpecks and appearances: when a piece of red ſtone is ſeen, chequered in this manner, it is the true porphyry, ſo eſteemed by the antients; in a word, this beautiful ſtone has no where its equal, and may juſtly be ſtiled the *Nonpareil of Merida.* Whenever the blue ſtone grows darkiſh, mixing with a little of the white, and ſome glimmer, it forms the grey porphyry, and when the green combines with fragments of white, it becomes the ſerpentine ſtone, and receives an admirable poliſh. Theſe various combinations into one ſolid maſs, evince, that at ſome remote period, they had a ſeparate exiſtence, in a ſtate of ſolution, or ſoft paſte: but if I am further aſked, when this ſurpriſing union happened? I ſhall be obliged to anſwer, that this is a circumſtance I am entirely ignorant of.

There are ſtill to be ſeen, in the city of Merida, the ſuperb remains of two aqueducts, a theatre, a triumphal arch, a naumachia, a circus, two handſome bridges, one over the Guadiana, and the other over the Albarregas; all which announce its former magnificence, excluſive of the ſtatues, inſcriptions, medals, and other antiquities, ſo frequently

quently dug out of its ruins †. It was made a Roman colony by the Emperor Auguſtus, after the Cantabrian war, became the capital of Luſitania, and ſtiled *Auguſta Emerita.* But at preſent agriculture and cultivation are at the loweſt ebb; nor do the banks of the river, in its neighbourhood, afford that verdure and pleaſing ſhade, ſo greatly praiſed, even in the days of Prudentius, who ſaid of this place,

Nunc locus Emerita eſt tumuli
Clara colonia Vettoniæ
Quam memorabilis amnis Anas
Præterit, et viridante rapax
Gurgite mœnia pulcra alluit.

T LETTER

† The great indolence and negligence of our countrymen, with reſpect to antiquities, ſays Don Antonio Ponz, generally engages ſuch travellers as come to Merida, to ſpeak ſlightingly of our want of taſte and little curioſity. In the year 1752, when Don Juan Williamſon viſited that city, he made no difficulty to declare, that if the King had made excavations at Merida, as Don Carlos had done at Naples, he concluded it would turn out, in a manner, a ſecond Herculaneum.—Viage de Eſpana. Tom. 8. Madrid, 1778. —This perſon here mentioned, was the Rev. Dr. Williamſon, chaplain of the Britiſh factory at Liſbon, whom Ponz, by miſtake, calls the Britiſh ambaſſador, at that court. Our envoy, at that time, was Mr. Caſters, who died, in Liſbon, in 1756, where I happened to be, when that city ſtill lay in ruins, in conſequence of the fatal earthquake, of the firſt of November, 1755.

LETTER III.

Natural hiſtory of the locuſts that ravaged the province of Eſtremadura, in the years 1754, 1755, 1756, *and* 1757, *from the obſervations of Don Guillermo Bowles.*

THE locuſts, of which I am now going to ſpeak, are continually ſeen in the ſouthern parts of Spain, particularly in the paſtures and remote uncultivated diſtricts of Eſtremadura, but in general are not taken notice of, if not very numerous, as they commonly feed upon wild herbs, without preying upon gardens, and cultivated lands, or making their way into houſes. The peaſants look at them with indifference, while they are friſking about in the fields, neglecting any meaſures to deſtroy them, till the danger is imminent, and the favourable moment to remedy the evil is elapſed.

Their yearly number is not very conſiderable, as the males are far more numerous than the females. If an equal proportion was allowed, only for ten years, their numbers would be ſo great, as to deſtroy the whole vegetative ſyſtem.

Beaſts

Beaſts and birds would ſtarve for want of ſubſiſtence, and even mankind would become a prey to their ravenous appetites. In 1754, their increaſe was ſo great from the multitude of females, that all La Mancha and Portugal were covered with them, and totally ravaged. The horrors of famine were ſpread, even furthur, and aſſailed the fruitful provinces of Andaluſia, Murcia, and Valencia.

The amours of theſe creatures are objects of ſurpriſe and aſtoniſhment, and their union is ſuch, that it is difficult to ſeparate them. When this ſeparation is voluntary, after having laſted ſome hours, they are ſo exhauſted, that the male retires immediately to the water for refreſhment, where, loſing the uſe of his limbs, he ſoon periſhes, and becomes an eaſy prey to the fiſh; having given life to his offspring, at the expenſe of his own. The female, diſembarraſſed, though not without violent ſtruggles, ſpends the remainder of her days in ſome ſolitary place, buſy in forming a retreat under ground, where ſhe can ſecure her eggs, of which ſhe generally lays about forty, ſkreening them by her ſagacity, from the intemperature of the air, as well as the more immediate danger of the plough, or the ſpade; one fatal blow of which, would deſtroy all the hopes of a riſing generation.

The manner of her building this cell is equally ſurpriſing. In the hinder part of her body, nature has provided her with a round, ſmooth inſtrument, eight lines in length, which, at its head, is as big as a writing quill, diminiſhing to a hard ſharp point, hollow within, like the tooth of a viper, but only to be ſeen with the lens. At the root of this vehicle, there is a cavity, with a kind of bladder, containing a glutinous matter, of the ſame colour, but without the conſiſtency, or tenacity of that of the ſilk-worm, as I found by an experiment, made for the purpoſe, by an infuſion in vinegar, for ſeveral days, without any effect.

The orifice of the bladder correſponds exactly with the inſtrument which ſerves to eject the glutinous matter, it is hid under the ſkin of the belly, and its interior ſurface is united to the moveable parts of the belly, and can partake of its motions, forming the moſt admirable contexture, for every part of its operations, as ſhe can diſpoſe of this ingredient at pleaſure, and eject the fluid, which has three very eſſential properties: Firſt, being indiſſoluble in water, it prevents its young from being drowned; next, it reſiſts the heat of the ſun, otherwiſe the ſtructure would give way and deſtroy its inhabitants; laſtly, it is proof againſt the froſt of winter, ſo as to preſerve a neceſſary warmth within.

For

For the greater ſecurity, this retreat is always contrived in a ſolitary place; for, though a million of locuſts were to light upon a cultivated field, not one would depoſite her eggs there, but whereever they meet a barren and loneſome ſituation, there they are ſure to repair, and lay their eggs: this difference in the earth they diſcover by the ſmell. Thoſe who are of another opinion, ſurely have not obſerved the delicacy of thoſe organs in every ſpecies of inſects, birds, and animals, which govern all their purſuits. I have even ſeen numbers of waſps come to a piece of meat, placed in an open field, and covered over with a glaſs, ſo that their motions, which ſeem the reſult of reflection, ariſe from the emanations and effluviæ in the air, which ſtrike their delicate organs. I have ſeen legions of inſects fly to places where they were bleaching wax; the workmen obſerve, that the minute they touch it, they become faint, and if they do not, by a ſudden exertion, free themſelves from that vapour, which exhales about half an inch from the wax, they are ſuffocated, as we ſhould be by the fumes of charcoal. Every one knows with what ſagacity birds of prey fly to ſuch diſtances, guided by the effluviæ of cadaverous bodies. Thus the locuſt of Eſtremadura, diſtinguiſhes the tilled land from the barren, and regulates its conduct in conſequence, though ignorant of the motive of this preference, nor can it have

any

any idea of the ſpade, nor rejoice at the thoughts ſaving its progeny; acting in conſequence of that infinite perfection of its nature, given originally by the omnipotent creator. Like other inſects, its motions are the conſequences of primitive laws, founded on infinite wiſdom, and not proceeding from ſecondary reflection; there its behaviour preſerves a conſtant ſameneſs, and uniformity, originally perfect, and not ſtanding in need of alteration, or improvement. The firſt locuſts were as ſkilled as the preſent race, and their progeny will tread in their ſteps. Thoſe who call it inſtinct, I ſuſpect, do not underſtand what they mean, nor explain to us the true ſenſe of that word.

Having ſpent many hours and days in obſerving the labours of the locuſt, I ſhall now proceed to deſcribe them. The female begins, by ſtretching out her ſix legs, fixing her claws in the ground, and holding with her teeth to the graſs; then expands her wings, to preſs her cheſt cloſe to the ground; where, clinging firmly, and raiſing that part of the belly, where ſhe has the inſtrument mentioned before, after forming a right angle with her body, ſhe fixes it, with ſuch ſtrength, that it faſtens to the hardeſt earth, and even in ſtone; ſhe has all the neceſſary apparatus to make a perforation, but this alone would not anſwer the

the purpoſe, a place being ſtill wanted wherein ſhe may depoſit her eggs.

This hollow cavity is made in about two hours; ſhe then begins to ſhift the earth underneath, and emits the glutinous ſubſtance. Having thus kneaded the earth into a ſubſtantial paſte, and ſmoothed the floor with her trunk, ſhe lays the firſt egg, then renews the operation and lays more, with admirable order, and after various repetitions, completes the whole in about four or five hours; next covering the ſuperior aperture with a glutinous compoſition, the ſtructure is perfect, with every advantage againſt the inclemency of the weather, or any hoſtile invaſion.

The female is now overcome with fatigue, few having ſtrength, like the male, to ſeek after refreſhing waters; but, exhauſted and ſpent, they expire cloſe to to their progeny, exhibiting a melancholy ſight to the labourer; who, from their appearance, foretells the miſchiefs to follow, without being able to prevent them; forming an idea of the hidden enemies, who are to devour his harveſt, from the multitude of carcaſes he finds diſperſed in the fields.

I cannot omit one circumſtance, obſerved by many others, as well as myſelf; and that is, when the females are buſy in laying their eggs, or in turning the earth, a male would immediately fix on

on her back, another male upon him, and another beſides. Sometimes I have ſeen ſix males piled upon one another, over one female; the peaſants pretended it was to give her more weight and ſtrength to open the ground; but this could not be the reaſon, it ſeeming rather a moment of fury, as obſerved amongſt animals; the more as I obſerved, that notwithſtanding the great number of females in 1754, that of the males was ſtill greater, even before they toook wing, ſo as to be two or three hundred males to one female, and when they ſallied out of Eſtremadura, to ravage La Mancha, I think I can take upon me to ſay, there were twenty males to a female; their ſex is eaſily diſtinguiſhed by their body and trunk, which induces me the more readily to give weight to my conjecture, from the great ſuperiority of numbers in the males, who, luckily for mankind, are ſeemingly diſappointed in their purſuits.

The egg which incloſes the embryo, has the ſame cylindrical ſhape as the repoſitory it is laid in, being a membraneous cylinder, one line long, very white and ſmooth. They are placed aſide each other, rather obliquely, the head, as in others being neareſt the part where it is to come out. The time of hatching varies according to climate, thoſe that are in high and mountainous places, being generally later than thoſe on the plains. I ſaw legions of them ſkipping about at Alme-

Almeria in February, becauſe the climate is ſo mild there that moſt kind of greens are nearly over at that time. In Sierra Nevada they only begin to appear in April, and in La Mancha they were hardly animated in May, when there were no greens yet in the market of San Clemente. So that they form a certain thermometer to judge of the warmth of the air. From theſe various ſituations proceed thoſe immenſe ſwarms of locuſts which appear ſucceſſively in June, July, and Auguſt; but as they always lay their eggs in barren places which require a certain additional warmth, and temperature, to hatch them, it will account for their not appearing ſo frequently in cold climates, except ſuch caſual ſwarms of them as may have been wafted there by the winds.

When they firſt come out of the egg, they are black, of the ſize of a gnat, and gather in great heaps at the foot of ſhrubs, particularly the *ſpartum* or matweed, continually leaping upon each other, and occupying a ſpace of three or four feet in circumference, two inches high. The firſt time I beheld this ſight, it ſurprized me exceedingly, to obſerve this moving body, like a mourning ſcarf waving about, as at this period they only live upon dew, and are friſking about to catch it. For a few days they move at a very little diſtance, their limbs being weak, their wings very ſmall, and their teeth not ſufficiently ſtrong to bite the graſs. In about

about twenty days, they begin to feed on the youngeſt ſhoots of plants, and as they grow up, they leave the ſociety of each other, and range further off, conſuming day and night every thing they fix upon, till their wings have acquired a full degree of ſtrength; in the mean time, they ſeem to devour, not ſo much from a ravenous appetite, as from a rage of deſtroying every thing that comes in their way. It is not ſurpriſing, that they ſhould be fond of the moſt juicy plants and fruits, ſuch as melons, and all manner of garden fruits, and herbs, feeding alſo upon aromatic plants, ſuch as lavender, thyme, roſemary, &c. which are ſo common in Spain, that they ſerve to heat ovens; but it is very ſingular, that they equally eat muſtard ſeed, onions, and garlic; nay, feed upon hemlock, and the moſt rank and poiſonous plants, ſuch as the thorn apple * and deadly night ſhade. † They will even prey upon crowfoot, whoſe cauſticity burns the very hides of beaſts; and ſuch is their univerſal taſte, that they do not prefer the innocent

* Thorn apple. Datura ferox of Linnæus.

† Deadly night-ſhade, or Dwale. Atropa Belladonna. Linn.—Solanum Lethale *Park.* 346. *Gerard* 340. The whole plant is poiſonous, and children allured by the beautiful appearance of the berries, have too often experienced their fatal effects.—See a curious account of this plant in Dr. Withering's Botanical Arrangement, &c. vol. 1 page 256.

nocent mallow to the bitter furze, or rue to wormwood, conſuming all alike, without predilection or favour, with this remarkable circumſtance, that during the four years they committed ſuch havock in Eſtremadura, the love apple, or *lycoperſicon ſolanum* of Linnæus, was the only plant that eſcaped their rapacious tooth, and claimed a reſpect to its root, leaves, flowers and fruit. Naturaliſts may ſearch for their motives, which I am at a loſs to diſcover, the more, as I ſaw millions of them light on a field near Almaden, and devour the woollen and linen garments of the peaſants, which were lying to dry on the ground. The curate of the village, a man of veracity, at whoſe houſe I was, aſſured me, that a tremendous body of them entered the church, and devoured the ſilk garments that adorned the images of ſaints, not ſparing even the varniſh on the altars. The better to diſcover the nature of ſuch a phænomenon, I examined the ſtomach of the locuſt,* but only found one thin and ſoft membrane, with which and the liquor it contains, it deſtroys and diſſolves all kinds of ſubſtances, equally with the moſt cauſtic and venemous plants, extracting from them, a ſufficient and ſalutary nouriſhment.

Out

* Swammerdam tells us, the locuſt is of the ruminant kind, thinking to have diſcovered in them a triplicate ſtomach, like thoſe animals; but he may have been deceived, and ſeen one thing for another, or examined locuſts different from theſe of Spain.

Out of curioſity, to know the nature of ſo formidable a creature, I was urged to examine all its parts with the utmoſt exactneſs: Its head is of the ſize of a pea, though longer, its forehead pointing downwards, like a handſome Andaluſian horſe, its mouth large and open, its eyes black and rolling, added to a timid aſpect not unlike a hare. With ſuch a daſtard countenance, who would imagine this creature to be the ſcourge of mankind! In its two jaws, it has four inciſive teeth, whoſe ſharp points traverſe each other like ſciſſars, their mechaniſm being ſuch as to gripe or to cut. Thus armed, what can reſiſt a legion of ſuch enemies; after devouring the vegetable kingdom, were they, in proportion to their ſtrength and numbers, to become carniverous like waſps, they would be able to deſtroy whole flocks of ſheep, even the dogs, and ſhepherds; juſt as we are told of ants in America, that will overcome the fierceſt ſerpents.

The locuſt ſpends the months of April, May, and June, in the place of its birth; at the end of June its wings have a fine roſe colour, and its body is ſtrong. Being then in their prime, they aſſemble for the laſt time, and burn with a deſire to propagate their ſpecies; this is obſerved by their motions, which are unequal in the two ſexes. The male is reſtleſs and ſolicitous, the female is coy, and eager after food, flying the approaches of the male, ſo that the morning is ſpent in the courtſhip of

of the one, and the retreat of the other. About ten o'clock, when the warmth of the ſun has cleared their wings from the dampneſs of the night, the females ſeem uneaſy at the forwardneſs of the males, who continuing their purſuit, they riſe together five hundred feet high, forming a black cloud that darkens the rays of the ſun. The clear atmoſphere of Spain becomes gloomy, and the fineſt ſummer day of Eſtremadura more diſmal than the winter of Holland. The ruſtling of ſo many millions of wings, in the air, ſeems like the trees of a foreſt, agitated by the wind. The firſt direction of this formidable column is always againſt the wind, which if not too ſtrong, it will extend about a couple of leagues; they then make a halt, when the moſt dreadful havock begins; their ſenſe of ſmell being ſo delicate, they can find at that diſtance, a corn-field, or a garden, and after demoliſhing it, riſe again, in purſuit of another: this may be ſaid to be done in an inſtant. Each ſeems to have, as it were, four arms and two feet; the males climb up the plants, as ſailors do the ſhrouds of a ſhip; they nip off the tendereſt buds, which fall to the females below. At laſt, after repeated devaſtations, they light upon ſome barren ground, and the females prepare for laying their eggs.

What a diſmal ſight for a poor farmer, after having being viſited by ſuch cruel gueſts! A ſenſible

ſible man, amongſt them, on viewing his corn-fields, where nothing was now left but chaff, thus expreſſed himſelf; "If theſe creatures were not "ſo coy, and would ſuffer the embraces of their "mates, in the country where they were hatched, "we ſhould not be loaded with ſuch dreadful miſ-"fortunes; but, like us, they fear death, and "ſtrive to prolong life; for which reaſon, they "ſhun the advances of the males, knowing, that "afterward nothing is left, but to depoſit their "eggs and expire!"

We learn, by tradition, as well as from hiſtory, that theſe locuſts have been a plague to the meridional provinces of Spain time immemorial. I remember to have read in an old Spaniſh novel, the following queſtion, "which was the animal that "reſembled moſt all other animals?" the anſwer was, "the locuſt; becauſe he has the horns of a "ſtag, the eyes of a cow, the forehead of a horſe, "the legs of a crane, the neck of a ſnake, and "the wings of a dove."

However puerile this may appear, it proves the great length of time they have been known as well as dreaded. Many old people aſſured me, when ſo much miſchief was done in 1754, it was the third time in their remembrance, and that they always are found in the paſture grounds of Eſtremadura, from whence they ſpread into the other provinces.

vinces of Spain. They are certainly indigenous, being of a different ſhape from thoſe of the north or the Levant, as is evident in comparing them with ſuch, in the cabinets of natural hiſtory. The locuſt of Spain is the only one that has roſe-coloured wings: beſides, it is impoſſible they can come from any other part; from the north it is clear they do not, by the obſervation of ſo many ages; from the ſouth they cannot, without croſſing the ſea, which is hardly poſſible, by the ſhortneſs of their flight, and, like birds of paſſage, they would be known. I once ſaw a cloud of them paſs over Malaga, and move towards the ſea, and go over it, for about a quarter of a league, to the great joy of the inhabitants, who concluded they ſoon would be drowned; but to their diſappointment, they ſuddenly veered about towards the coaſt, and pitched upon an uncultivated ſpace ſurrounded with vineyards, which they ſoon after quitted. When once they appear, let the number demoliſhed be ever ſo great, the proportion remaining is ſtill too conſiderable; therefore, the only way to put an end to ſuch a calamity, is to attack them before hand, and deſtroy their eggs, by which means they might be totally extirpated. *

LETTER

* In the life of Dr. Thomas Moffet, prefixed to a work of his, intitled, "Health's improvement, London, printed

LETTER IV.

Of the barren and wretched diſtrict of Batuecas, in Eſtremadura.

THE territory of Batuecas, ſituated on the confines of Caſtile and Eſtremadura, near Portugal, has given ample ſcope to the fanciful conceits of different writers, relating to its imaginary diſcovery, and whether or not as ſuppoſed, it was an unknown land, inhabited by Pagans, blinded by ignorance, without the leaſt knowledge of the Chriſtian religion. This diſtrict we are now going to explore, is fourteen leagues to the ſouth weſt of Salamanca, about eight leagues eaſtward of Cuidad Rodrigo, and twelve to the north weſt of Plaſencia, forming a plain, or more properly, a moſt diſmal and horrid gully at the foot of that famous mountain, where ſtands

ed for T. Oſborne, 1746;" mention is made of his Theatre of inſects publiſhed abroad in 1598, where ſpeaking of locuſts, he particularly relates, how much the Spaniards were then afflicted with ſwarms of them, that flew over from Africa, the news of which was received when he was writing that account. If to this occaſional calamity, we add the the frequent droughts to which their meridional provinces are ſo ſubject, and which cauſe ſuch diſtreſs amongſt the poor, it will be a great drawback from their boaſted fertility.

ſtands the noted convent called *La Pena de Francia.* The ſituation of this place inſpires every idea of gloom and melancholy, cloſed in by jagged mountains, where hardly a tree is to be ſeen, or the leaſt appearance of vegetation: on the contrary, numberleſs precipices, occaſionally choaked up by broken maſſes of ſtone, detached inſenſibly from the rocks, form the moſt frightful ſcene the mind can conceive. Such is the true ſtate of Batuecas, horrid by nature; rendered ſtill more ſo, by ignorance and folly. The itinerary from Plaſencia to the convent of Batuecas, is as follows: Plaſencia to Aigal four leagues; Mohedas one; Caſar de Palomero one; Cambroncino two; Vegas de Coria two; Las Meſtas one; and to the convent of Batuecas half a league.

Between Plaſencia and Aigal, the hamlets of Oliva and Gijo de Granadilla, appear on the right, and Santibanez el Baxo, on the left, with woods of oak and cork trees. You croſs the river Ambroz, or de Caparra, and paſs by the Puerto del Gamo, before you reach Caſar de Palomero. Then enter the melancholy diſtrict of the Jurdes, being a diviſion of what is generally called Batuecas; but in any part of this wretched country, if you aſk whereabout is the Jurdes, ſome will tell you, a little further on, and when you proceed, another informs you, it is at a ſmall diſtance be-

hind; nobody being willing to acknowledge himſelf an inhabitant of the unhappy country of the Jurdes.

The valley of Batuecas, was idly conſidered as an unknown part of the world, by thoſe who gave into the fabulous accounts invented in the reign of Philip the IId. though an enlightened age in the annals of Spain. As a further proof of the ideas of the times, we have only to look back on the report made by Galarza, biſhop of Coria, to whoſe dioceſs this country belongs, when he gave leave to the Carmelite friars to build a church there, which document is to be found in the records of that houſe. "I give thanks to the Almighty (ſays "this prelate) that in ſo deſolated and wretched a "country, where it appears from certificates, "which I have among the records of my biſhopric, "that about forty years ago its inhabitants were "Gentiles, deceived by the devil with viſible appa-"ritions, his majeſty has now ordered a ſanctuary "to be built, to which I give my concurrence with "great ſatisfaction, and ſhall as far as lies in my "power, contribute towards ſo pious a foun-"dation."

This record being poſitive, and the good biſhop having given ear to the many exaggerations and falſe reports, obtruded on the public, might have confirmed theſe fables in the minds of the people, which

which inſenſibly ſpread themſelves over Spain, and extended even amongſt foreign nations. They were the more eaſily propagated at Batuecas, amongſt ignorant people, in want of paſtors and Chriſtian inſtruction; their neighbours then took the alarm, and would not venture to move forward with their flocks. In more remote villages theſe reports loſt nothing by the way, ſo that in many places, the poor harmleſs inhabitants of Batuecas were looked upon as ſavages, deſtitute of all information, beyond their bleak hills, where they lived in the groſſeſt ignorance, and were ſuppoſed to worſhip the devil.

It was given out as an incontrovertible fact, that a certain lady, belonging to the illuſtrious houſe of Alba, ſeduced by her lover, had fled to theſe parts, and firſt made the diſcovery, meeting with a barbarous people, whoſe manners, and even language, were ſtrange to them, except a few Gothic expreſſions. Such were the tales believed at Salamanca, the ſeat of a famous univerſity; at Madrid, the reſidence of the court, and in many other places of note. It ſerved as a foundation for novels, as well as dramatic performances, repeatedly exhibited on the ſtage, and propagated all over the kingdom.

Soon after the friars had ſettled themſelves in this place, and ſpoken to the graver ſort of people, concerning theſe matters, many of them laughed

at their ſimplicity, while others expreſſed their indignation againſt the inhabitants of Alberca, whom they reproached with being the authors, through motives of jealouſy, of ſuch a ridiculous and invidious report.

The town of Alberca is the principal place in the territory of Batuecas, and not above a league diſtant from this valley: its inhabitants could not be ſuppoſed ignorant of the fallacy of the report, as their flocks were conſtantly grazing there; yet, ſo great was the prejudice and ignorance of the people, that Thomas Goncales Manuel, a clergyman of the town of Alberca, thought it neceſſary to juſtify his countrymen, and in 1693, publiſhed an eſſay in their defence, under the title of "A true narrative and apologetical declaration of the antiquity of Batuecas;" in which he ſeriouſly refutes the illuſion by authentic documents and records, belonging to the town of Alberca, and its neighbourhood.

The late father Feijoo ſaid every thing neceſſary on this ſubject, in his critical works,* intended to explode the many vulgar errors that prevail amongſt his countrymen, adding his aſtoniſhment that they ſhould have been corroborated by national writers, ſuch as Nieremberg † and Alonſo Sanchez; ‡ by which

* Theatro critico, tom. 4. Diſc. x.

† Nieremberg curioſa philoſophia, lib. 1. cap. 35.

‡ De rebus Hiſpaniæ, lib. 7. cap. 5.

which means they even got credit abroad, and geographical writers of no ſmall reputation ventured to copy them; particularly Thomas Corneille, and the author of the Great Atlas, as well as Moreri in his Dictionary.

The whole of this diſtrict may properly be reduced to an interſected valley of about a league in length, ſometimes ſo confined as juſt to leave room for the paſſage of the river that gives name to the valley: This then was that unknown country ſo ſurprizingly dreaded, where it is certain no others dwelled but a few wretched ſhepherds, and ſome miſerable peaſants, in forlorn huts, ſurrounded by precipices, diveſted of all intercourſe with their neighbours, in a wild romantic ſituation, which the moſt fanciful pencil would find difficult to delineate, or the language of Shakeſpeare to deſcribe.

The other valley called, "of the Jurdes," which may be about four leagues long, and three in breadth, yields not to the former in wretchedneſs and miſery. During the whole journey from Alberca to Batuecas, nothing is to be ſeen but a repetition of jagged and illſhapen rocks, with their rugged peaks, like ſo many turrets and battlements, towering one over the other, as far as the eye can extend, forming dreadful gullies where the river forces its way, whoſe waters are clear, abounding with trout, and having grains of gold

in

in its ſands, which the peaſants know well how to look after, and ſell at Plaſencia, Cuidad Rodrigo, and Salamanca, * which is a great reſource to them in this ſorrowful vale; where during winter, the ſun's rays can hardly penetrate for above four hours in the day. To increaſe ſtill further its horror, the hills are perforated with diſmal caves, one above the other, and ſome ſo extenſive, that three or four hundred ſheep may eaſily take ſhelter there; to complete this picture of diſtreſs, let it ſuffice to add, that this country is the reſort of numerous birds of prey, and affords ſhelter to bears, wolves, wild cats, and weazles, which deſtroy all the hares and rabbets, with the addition of ſnakes, ſerpents, and many obnoxious reptiles, particularly one ſort of ſerpent, which darts at its prey with great violence, and perhaps may be of that ſpecies called *Jacula*, or *Jaculum ſerpens*, deſcribed in the acts of the Leopoldine academy, which mentions one of theſe to have darted from a ditch, to a conſiderable diſtance, and fixed itſelf upon the arm of a peaſant. But why need I enlarge any further on ſo dreary a ſpot, or deſcribe ſo barren a country, where even graſs is not to be ſeen! here and there a ſolitary ciſtus, and nothing but furze, the only reſource of goats and ſome bees, who are of ſervice merely on account of their wax, as their honey

* The ſame happens in the river Sil, in Galicia, where the poor people are employed in this manner, after floods.

honey is neither valuable for its colour nor flavour, having all the bitter taſte of their food.

In this wretched country the Carmelite Friars pitched upon a little plain on the banks of the river, and built their convent in 1599, but their houſe has nothing worthy of deſcription; and though the very ſight of a diſtreſſed traveller at their gates, ſhould be ſufficient to engage the benevolent minds of theſe holy fathers, they are ſeldom in a hurry to open their doors, and none are admitted or intitled to hoſpitality, but ſuch as are provided with letters of recommendation and poſitive orders from the provincial or general of their order.

LETTER V.

The convent of Juſte, in the Vera of Plaſencia, famo for the retreat of the emperor Charles the Vth.

WERE we to believe the exaggerated accounts which Spaniſh writers in general give of their country, we ſhould be inclined to imagine the whole kingdom was a paradiſe flowing with milk and honey, where nature had laviſhed her moſt luxuriant productions; but whenever the tra-

traveller happens to paſs through the interior parts of the kingdom, and to form his judgment from perſonal inſpection, he will then be convinced that many of theſe aſſertions require a conſiderable lowering before they are reduced to the ſimplicity of fact and of truth, for though it muſt be allowed that the ſouthern parts are fertile, that the plains of Valencia are delightful, and that the Biſcayners have been indefatigable in cultivating their rugged mountains, yet when we take a general ſurvey of the kingdom in the review of a journey through Spain, it will be found that barren hills and naked rocks and mountains, form a conſiderable part of the proſpect, diverſified only here and there with a few ſcattered ſpots of imperfect cultivation: Many diſtricts ſtill remaining uncultivated, and the rivers overflowing their banks without any impediment, in the ſame manner as they did in the earlieſt ages of the world; as if they were to receive every bleſſing from Providence without the leaſt trouble or fatigue.* Amongſt innumerable inſtances which might

* Don Antonio Ponz reproaches his countrymen very feelingly for their neglect on this ſubject in the following lines; "Los rios regularmente corren entre nos otros por donde Dios los encamino a principio del mundo, como ſi no hubiera dexado con grandiſſima providencianada que eſtudiar en el cultivo de las tierras, ſino que todo hubiera de ſer facil.

might be alleged in ſupport of this aſſertion, I ſhall confine myſelf to one given by the Spaniards themſelves, of the ſo much celebrated valley of Plaſencia, in Eſtremadura, repreſented by many as the moſt delightful place in the world, ſelected by the great Emperor Charles to finiſh his days, and ſuppoſed to be ſeated in an enchanting vale, covered with all manner of fruit trees in the higheſt perfection, where the very air was embalmed with the moſt delicious odours; but alas! this is far from being the caſe, as the judicious Spaniſh writer,† who lately viſited that province, informs us, who complains loudly of its moſt miſerable ſtate, and from his authority, therefore, I ſhall venture to pronounce on its preſent moſt wretched and neglected condition.

After quitting the city of Plaſencia, and croſſing the river Xerte, you paſs over the hill of Calcones, oppoſite the city, then deſcend into the territory of the Vega, leaving on your left the villages of Garguera, Barrado, and Arroyo Molinos; you next go

facil. No es aſſi, ni tal quiſo, ſobre cuyo punto dijo bien uno de los mejores poetas."

Pater ipſe colendi
Haud facilem eſſe viam voluit primuſque per artem
Movit agros, curis acuens mortalia corda. Virg. Georg. I.

Viage de Eſpana, tomo 3. Madrid 1777.

† Don Antonio Ponz.——See Viage de Eſpana, tom. 7. Madrid 1778.

go through the village of Paſaron, five leagues from Plaſencia, and come to a pleaſant ſituation called La Magdalena, where there is a good farm houſe, which formerly belonged to the Jeſuits: you are now at a league's diſtance from Juſte, and to go there you traverſe a woody country with a few cheſnut trees, and paſs ſeveral brooks, where they catch excellent trout. The convent of Juſte is ſituated nearly in the centre of the Vera, on the brow of a ſteep hill, which protects it from the North wind, and with other mountains forms that chain which is called the Puerto de Tornavacas, joining with the hills of Arenas, Puerto del Pico, and others.. Neither the convent nor church have any thing remarkable, and would have paſſed on to future ages in oblivion, had it not been for the diſtinction ſhewn them by the great Emperor who ended his life in this ſolitary place. Over the great altar in the church, they have a copy of that famous picture called the glory of Titian, which ſtood formerly here, and was removed to the Eſcurial by expreſs command of the Emperor, who ordered that the original ſhould be fixed in the ſame church with his remains. The following inſcription is ſeen on the wall, in a corner of the garden, underneath the arms of the Emperor.

"EN

"EN ESTA SANTA CASA DE S. HIERO-
"NIMO DE JUSTE SE RETIRO A ACABAR
"SU VIDA, EL QUE TODA LA GASTO EN
"DEFENSA DE LA FE Y CONSERVACION
"DE LA JUSTICIA, CARLOS V. EMPERA-
"DOR REY DE LAS ESPANAS CHRISTI-
"ANISIMO, INVICTISIMO. MURIO A 21
"DE SETIEMBRE DE 1558."

In this holy houſe of St. Jerom of Juſte, ended his days, he, who ſpent the whole of them in defence of the faith, and in ſupport of juſtice, Charles V. Emperor, King of Spain. Moſt chriſtian, invincible. He died on the 21ſt Sept. 1558.

Theſe are the only traces left here of that great Emperor, who once filled the world with the glory of his deeds. The ruined decorations of the garden and ponds ſeem to intimate their priſtine ſtate in happier days, and the ſeveral plantations in the Vera, watered by numberleſs brooks, might once have exhibited a more pleaſing appearance.

A diſtinction muſt be made between the *Vera of Plaſencia* and the *Valle de Plaſencia*. The valley extends from the city to the Puerto de Tornavacas, upon a ſtraight line from Eaſt to North, the length of nine leagues, and ſo level, that the whole extent lies open to your view, as far as the *Puerto*, cloſed by high mountains, dividing on the right hand the *Vera* from the *Valle*, and on the left the hills between the valley and the road to Banos, and

finally

finally thoſe of Tornavacas, whoſe high tops are always covered with ſnow.

The villages belonging to the valley are Aſperilla, Caſas del Caſtanar, El Torno, Valde Aſtilla, Cabrero el Rebollar, Navaconcejo, Cabezuela, Badillo, and Xerte, which gives name to the river, as Tornavacas does to the *Puerto*, but at preſent every branch of cultivation is at the loweſt ſtate, without even the appearance of an orange or a lemon tree, if we except two or three blighted ones at the convent of Santa Cruz de Tabilla, where the country is a deſart: and what is ſtill worſe, the mountains and paſſes are filled with aſſaſſins and robbers, to the great terror of the inhabitants and travellers. The *Vera* is no better, and affords the moſt melancholy aſpect imaginable; amongſt the various experiments to deſtroy the worms that ruin the cheſnut trees, fire was the laſt expedient, in ſo much, that the trees, ſcorched and half burned, now reſemble the oaks ſtruck by the thunder of Jove, inſtead of the golden age of the poets, and their whole agriculture is reduced to the ſowing a few peas, with ſome miſerable ſcraps of a vineyard. The villages of the *Vera* are Piornal, Barrado, Garguera, Arroyomolinos, Paſaron, Gargantalolla, Xarandilla, Gijo de Arandilla, Xarais, Robledillo, Aldeanueva de la Vera, Viandar, Villanueva, El Oſar, and Cuacos: This laſt being near to Juſte, and

and diſtinguiſhed by the ſavage diſpoſition and ferocity of its inhabitants; to ſuch a degree as to overcome the patience of that great perſonage who lived in their neighbourhood, by offering him every affront their low ſtation would permit, taking his cows if they happened to ſtray into their diſtrict, and ſtealing the trout reſerved for his uſe; and to crown all, flinging ſtones at Don John of Auſtria, the Emperor's ſon, whenever he ventured to taſte of their cherries.

LETTER VI.

Further obſervations made in the courſe of another tour by Don Guillermo Bowles from Almaden to the ſilver mine of Guadalcanal.

I SET out from Almaden for the village of Alcocer; in the plain there is a lead mine which has never been worked; after an hour's journey we came to the mountain of Lares, where there are ruins of a Mooriſh caſtle; here I ſaw for the firſt time the true Spaniſh emery, which before I only knew by ſpecimens in the cabinets of Paris; * the

* Emery is a ſort of metallic ſtone, found in moſt, or all mines of metals, but chiefly in thoſe of iron, copper, or gold, of which three kinds are uſually diſtinguiſhed; the Spaniſh

the hill where it is found, is of ſandſtone, mixed with quartz: this mineral is blackiſh, reſembles the Spaniſh red, and common emery. The firſt ſort is found in the gold mines of Peru, and other provinces of Spaniſh America. It is judged a kind of *Marcaſite* of that rich metal, being ſtreaked with little veins and ſpecks of gold, for which reaſon the king of Spain prohibits the exportation of it, whereby it is rendered exceedingly ſcarce, to the great regret of the ſearchers after the philoſophers ſtone, who build great hopes in the tranſmutation of this precious metal. The red emery is found chiefly in the copper mines of Sweden and Denmark. The common emery is taken out of iron mines, and is almoſt the only ſort uſed in England, the conſumption of which is very conſiderable amongſt the armourers, cutlers, lockſmiths, glaziers, lapidaries, maſons, and other mechanics, ſome of whom uſe it to poliſh and burniſh iron and ſteel works; other mechanics, ſome of whom uſe it to poliſh and burniſh iron and ſteel works; others to cut and ſcallop glaſs, marble, and precious ſtones.

The common emery is of a browniſh colour, bordering a little on red, exceedingly hard, and of courſe difficult to pulverize. The Engliſh are the only people that have got the art of making it into powder, which is done by mills contrived for the purpoſe, and in that ſtate they ſend it to their neighbours. Emery fuſed with lead and iron hardens them. It increaſes and heightens the weight and colour of gold. It is uſual to mix a little of it with the gold from Madagaſcar, which is naturally pale and ſoft. It is brought in Engliſh ſhips from the Levant, particularly from the iſland of Naxia, where it coſts but a crown the twenty-eight quintals; the quintal weighing 140lb. which is therefore what they uſually ballaſt their ſhips with. Rolt's Dict. of Commerce.

the poliſh given by the bloodſtone, and is ſo hard that it emits fire when ſtruck with ſteel. The Moors worked this mine, but more perhaps, for the ſake of the gold which it probably contains, than for any other motive; and as their method is not to be found in any Arabic book that I know of, either printed or manuſcript, I ſhould think the following trial might be made. Let the ore be firſt ſoftened by fire and water, then expoſed to the air for four or five months or more, that the phlogiſton might ſeparate, leaving the matter in a proper ſtate to extract the metal by fuſion. I found two ſorts of emery in Spain, one in a ferruginous ſtone, and the other in ſand loaded with iron. §

Between

§ Notwithſtanding what is ſaid here relating to emery, Mr. Bowles, in page 364 of his work, further informs us, that he found five ſorts of emery in Spain. Firſt, That of Reinoſa, compoſed of large grains. Secondly, Of very ſmall fine grains, found at the foot of Guadarrama mountains, and uſed at St. Ildefonſo, for poliſhing of cryſtals. Thirdly, The one of Alcocer, mentioned above, worked by the Moors, which has no grain, but on breaking the ſtone is ſmooth like an hæmatite, and contains a little gold. Fourthly, A ſpecies of emery, as it were marbled in quartz, found about Molina de Aragon, and in Eſtremadura, in a diſtrict granted by the king, to Don Pedro Rodriguez Campomanez, containing a little gold, but not worth the expenſe of ſearching for. Fifthly, Another ſort diſperſed in many parts

Between Alcocer and Orellana, there is an iron mine in ſandſtone, with the fineſt red ocre in the world. A ſteep mountain muſt be croſſed to arrive at Nabalvillar, where there are blood ſtones, and a ſpecies of black earth, which ſhines when rubbed in the hand, but is only a *blend* or dead mineral of no uſe. From hence you go to Logroſan, at the foot of a chain of hills which run from eaſt to weſt, called *La Sierra de Guadalupe*. In coming out of the village, a vein of phoſphoric ſtone croſſes the road obliquely from north to ſouth. It is a whitiſh ſtone without any flavour. When pounded and thrown on the fire, it burns and emits a blue flame, without any ſmell. * In the mountain to the north of this village, there is a ſilver mine in a whitiſh ſtone, with white *mica*, and in the mountain of *Guadalupe* to the ſouth, there is a copper mine in a ſlaty ſtone, jaſpered with blue and green. An extenſive uncultivated plain

parts of Spain, particularly in the Lordſhip of Molina, between Tortuera and Melmarcos, in looſe, black, heavy ſtones, ſeeming to be the reſidue of ſome rock or mine, and having when pulverized, hard pungent and mordicant particles.

* Mr. Bowles ſays it is the phlogiſton of the coal that cauſes this flame, but this explanation cannot be admitted; for it is well known that the phoſphoric ſtones emit a blue light, when heated, without being expoſed to any ſubſtance, ſuppoſed to contain phlogiſton.

plain lies half way between Nabalvillar and Logroſan, covered with the kermes oak; but before you reach Logroſan, the ſandſtone diſappears, and the houſes of that village are built with granite from the hills of *Guadalupe*.

After having gone out of our road to examine the phoſphoric ſtone, we returned again to Orellana, at which place we croſſed the Guadiana, where its bed is very ſhallow, in order to ſee a lead mine two leagues further to the ſouthward, on the road to Zalamea.* This mine is found on a ſmall eminence called *Vadija*, or *Valle de las minas*; the vein runs from north to ſouth, cuts the ſlaty ſtone, and is ſeen in a bed of quartz, which is

 diſcovered

* The town of Zalamea is ſix leagues from Aracena, in the very heart of the Sierra Morena. The country people have a tradition, that it was built by thoſe perſons ſent there by Solomon in queſt of the ſilver mines, who named the place after him, in proof of which they aſſert that a very antient caſtle juſt by, is ſtill called Caſtle of Solomon. One of the villages in the juriſdiction of Zalamea is named *Obiud*, and the river near it *Odiel*, being Hebrew names, which I was informed of, ſays a celebrated Spaniſh writer, by a clergyman, as well as by antient people of the place; but this is not ſo eaſy to prove, or for me to give aſſent to, merely on their traditional relations. If it were true, that the *Tharſis* of Scripture was *Tarteſſus*, then indeed it might be preſumed that the treaſures were got from hence; for which I refer them to Goropius Becanus Lib. 7. Hiſpanicorum. See Antiguedades de Sevilla por Rodrigo Caro. Sevilla 1634.

diſcovered from a brook about two hundred paces from the firſt ſhaft, where the vein does not follow as I ſaid above, but ſtrikes off from eaſt to weſt. The miners loſt it by croſſing the brook from north to ſouth, when they ſhould have followed it according to the direction of the ſoft ſlate as I did, and found it again.

Continuing two leagues further to the ſouthward from this mine towards Zalamea, there is a ſilver mine without any lead in the ſpar; this vein is found in a rock of granite, cut contrary to its natural direction, and conſiſts of ſpar, quartz, white and yellow pyrites, with a ſhining, black, ſmall pyritous matter. The country, for many leagues round, is replete with immenſe pieces of granite, lying above ground, like the rocks of Fontainebleau; the land produces a great deal of corn, and is well furniſhed with oak.

Theſe two mines being ſo near to each other, might be reciprocally advantageous, as the lead would be uſeful for refining the pyritous ſilver. In the one which is abandoned, the remains of a crucible and reverbatory furnace are ſtill to be obſerved; they quitted it on being overwhelmed with water, but it might eaſily be cleared again, it being ſituated on an eminence, called *Chantre*, as the lead mine is on another, 300 feet higher than

than a brook, where, in ſummer, there is ſeldom any water.

From Zalamea we paſſed an extenſive plain of eleven leagues, called *Vinolas de Zalamea*, and came to the village of Berlanga; where entering upon the *Sierra Morena*, we arrived, in four hours, at the famous town of Guadalcanal, obſerving great quantities of ſumach in theſe parts, which is cut in the month of Auguſt; after which the leaves and flowers are pounded and ſold to the curriers of Seville, who uſe it for dreſſing of leather. †

LETTER VII.

Deſcription of the famous ſilver mine at Guadalcanal in Eſtremadura.

THE town of Guadalcanal is the laſt to the ſouthward in the province of Eſtremadura, only ſeparated from Andaluſia by the ſmall ſtream of Benalija. The famous and boaſted ſilver mine of

† The beſt Sumach is that which is greeniſh and new; Oporto in Portugal, being the place which furniſhes the moſt, and generally ſpeaking, the beſt. Rolt's Dict. of commerce.

Guadalcanal, § ſo celebrated by hiſtorians, and of which ſuch various and uncertain accounts have been publiſhed, is ſituated about half a league diſtant from the town of that name, belonging to the knights of Santiago, and ſurrounded with high mountains. The firſt diſcovery of this mine, according

§ This is not Mr. Bowles's account of the Guadalcanal mine, but I have reaſon to think it a more perfect one, giving the real ſtate and preſent condition of the mine from whence a judgment may be formed of Mr. Bowles's conjectures. He ſays there are about 8000 families at Guadalcanal; but they exceed a thouſand, beſides a convent of friars, three convents of nuns, and ſixty eccleſiaſticks, who do not enter into the contribution roll, though they have houſes and families. He mentions the mine being a league diſtant from the town, whereas it is only a mile and a half. He tells us, Guadalcanal is a very dry ſpot, though the inhabitants allege that there is not a more moiſt and damp town in all Eſtremadura. In the ſquare there is one of the richeſt ſprings of excellent water that can be met with any where, and all the houſes have wells at a ſmall depth. There are four fountains in different parts of the town, which have no connection with the principal ſpring in the ſquare, beſides ſeveral ſmall ſpouts of water continually running in the ſtreets, that make the houſes ſo damp, that the lower apartments cannot be inhabited without inconvenience before July. Though he ſays the galleries of the mine were in perfect good order, he could not have a juſt notion of them, proceeding no further than 50 feet, for the information of Don Joſeph de Carvajal, miniſter of ſtate at that time.

cording to the beſt information, was made by a farmer of the town of Guadalcanal, whoſe name was Delgado. This man accidentally met with the ore, as he was ploughing his fields: being ſtruck with its brightneſs, he carried it home, after carefully covering the place, and then ſet out for Seville, where he was informed it was a valuable ore. This is ſaid to have happened in the year 1509, ſoon after the diſcovery of America by Columbus, and is looked upon as the moſt ancient record of this mine. The ſurpriſing accounts which uſed daily to arrive from America, relating to thoſe new diſcovered mines, added to the little information Delgado was able to procure at home, inſpired him with the ſame ardour as many of his countrymen, and engaged him to repair thither for further inſtruction, where, after obtaining all the lights in his power from the American miners, he returned again to Spain, made a diſcovery to the court of the mine of Guadalcanal, ſoliciting a grant, and propoſing to work it at his own expenſe. Though it might be ſuppoſed, this muſt have anſwered his purpoſe, nothing appears from hiſtory, either with reſpect to himſelf, or his heirs; and what is ſtill more ſingular, the mine ſeemed to be without any proprietor in the reign of Philip the ſecond, which gave riſe to the laws promulgated in his reign, under the title of *Ordenanzas de Minas*, and are to be found in the *Recopilacion*, or code,

code, publiſhed by that prince, which with reſpect to mines, are the only laws extant in the kingdom.

The Fuggers of Augſburg, obtained a grant of them from Philip the ſecond, after they had been worked for ſome time on the king's account. Several Spaniſh writers aſſert, that immenſe riches were taken out of this mine, particularly Carranza, in his treatiſe on Spaniſh coins, * affirms, that one week with another, they extracted the value of ſixty thouſand ducats. The hiſtory of the houſe of Heraſti ſays, that this mine had produced eight millions of *peſetas*, † which were employed in building the Eſcurial. Be this as it may, the chief ſhaft in the mine acquired the name of *Pozo Rico*, "The rich ſhaft", and continued in the hands of the Fuggers and their heirs, until 1635, when they totally abandoned it, after having gone a great depth, and formed ten galleries, though it is ſurmiſed they continued it for political reaſons, to cover other projects, as they ſolicited conſiderable loans to purſue their works, and when they relinquiſhed it, reports were ſpread, that it contained ſeveral rich veins of ſilver ore, which none could contradict, for in leſs than a month the mine

* Licenciado Alonſo Carranza Ajuſtamiento de Monedas y reduccion de metalles. Madrid, 1629.

† Valuing the peſeta at 10*d.* ſterling, the eight millions above-mentioned will amount to £.333,333, 6*s.* 8*d.* ſterling.

mine filled with water within thirty feet of the ſurface. This opinion however has been handed down from one to another to the preſent time.

In 1690, Raphael Gomez, a Jew, obtained a grant of this mine from Charles the ſecond, and formed a company with ſome Portugueze merchants of his tribe. They attempted to drain Pozo Rico, but for want of a ſufficient capital, engines, and intelligent workmen, they could not drain further than the third gallery, and failing in their future attempts, were charged with duplicity and fraud; Gomez was arreſted and carried priſoner to Seville, where he underwent a long and ſevere confinement, though he printed his caſe and defence, but died before the buſineſs came to an iſſue.

The diſtracted ſtate of king Charles's finances, ſuggeſted to his miniſters the idea of continuing the works of theſe mines; on this account, and to give this operation a more plauſible appearance, the guilt of Gomez was to be made more conſpicuous; Don Alonſo Carillo Rueda, of the council of finances, was named ſuperintendant of the mines, and ordered to repair thither directly, and carry on the works on his majeſty's account; following the directions of a wandering friar lately returned from America, appointed chief engineer, on a ſuppoſition of his knowledge in

in mines. Carillo arrived at Guadalcanal in 1695, and Gomez was arreſted as mentioned before; he then proceeded in his commiſſion with all the deliberation and formality of the law, iſſuing out orders, and multiplying writings at every ſtep; they began to drain Pozo Rico, but never went further than the third gallery; ſickneſs, want of money, and other impediments, baffled all their attempts; this famous mine was once more abandoned, and Carillo and his retinue returned to Madrid.

The death of Charles the ſecond, the laſt Auſtrian monarch of Spain, and the ſucceſſion war which followed, prevented all further purſuits of this kind, till 1725, when a new company was formed at Madrid, with freſh expectations of ſucceſs. The draining of Pozo Rico was once more undertaken, but all their labours were fruitleſs. In this embarraſſed ſituation a new ray of light ſeemed to pierce the receſſes of theſe hidden mines, and revive the drooping ſpirits of the preſent adventurers, raiſing them from a deſponding anxiety, to the moſt ſanguine expectation. The perſonage who was to work this ſurpriſing alteration, was no leſs a character than an Engliſh lady of quality, of very high rank. In 1728, lady Mary Herbert, daughter of the marquis of Powis, arrived at Madrid from Paris, where ſhe had been concerned in the Miſſiſſippi ſchemes, and by her acquaintance with the famous

famous Mr. Law, had improved her talents and natural genius for enterprize, which engaged her to ſet out for Madrid, and make propoſals to the Spaniſh company for draining the ſilver mine of Guadalcanal, in which expedition ſhe was attended by Mr. Joſeph Gage, grandſon of Sir Thomas Gage, Bart. of Hengrave, in Suffolk.

Thoſe who are acquainted with the genius of the Spaniards, and the great deference they pay to the fair ſex, will eaſily conceive what impreſſion ſuch an offer muſt have made, when, excluſive of the profit it offered, it came from a lady of the moſt illuſtrious birth, with the additional advantages of perſon and talents. Lady Mary propoſed to the company to drain the mines, on condition they would allow her two hundred thouſand dollars,* payable at different times as ſhe proceeded, and half the profit of the mine, which was readily accepted, and a formal agreement concluded; the Spaniſh company having raiſed a conſiderable ſubſcription by public authority. Lady Mary ſet out for the mines, and procured engines from England, as well as miners, engaging her own fortune in the undertaking as well as that of Mr. Gage, and a large ſum from the noble marquis her father; Her agents undertook the draining of Pozo Rico, and had

* £33,336 6*s.* 8*d.* ſterling, valuing the current dollar at 40*d.* Engliſh.

had tolerable ſucceſs, receiving punctual payment from the company; but towards the end, diſputes began to ariſe, the Spaniards inſiſted that Lady Mary's agents were obliged to clear away the mud, and remove every obſtruction from rubbiſh in the galleries: Her ladyſhip endeavoured to prove her contract only related to the water: the payments were ſtopped, and a ſuit at law commenced. Lady Mary went on at her own expenſe, and thoroughly cleared the mine to the tenth gallery. Here there was ſuppoſed to be a rich vein of mineral, and as no Spaniard had gone to that depth, the opinion was eaſily circulated: it got further credit, when lady Mary preſented a petition to the judge conſervator of the mine, requeſting in a judicial form, that a quantity of this ore ſhould be brought up and ſmelted in preſence of the court; its value properly aſcertained, and atteſted. The judge iſſued his decree accordingly, but as all the agents were foreigners, and united in their views, an impoſition is ſaid to have been artfully practiſed, in preſence of the judge and officers of the court, as well on the Spaniſh agents, as on the numerous witneſſes preſent on the occaſion. Out of 40lb. of ore ſuppoſed to be from the tenth gallery, the produce was made evidently to be ten pounds, thirteen ounces of fine ſilver; which was handed about in an oſtentatious manner, and afterwards ſhewn to the king, who then reſided

reſided at Seville, by the marquis de la Paz, prime miniſter of Spain, which fixed the reputation and riches of this mine beyond all manner of doubt. The law ſuit had continued againſt lady Mary for two years, and as the preſerving the galleries already drained, was very coſtly, they ſoon filled again with water; but her ladyſhip, by her high rank and polite addreſs, having been able to acquire a powerful intereſt at court, king Philip, out of his natural benevolence and equity, after being informed of all theſe tranſactions, was pleaſed to declare, That lady Mary Herbert had fulfilled her engagements: giving a decree in her favour, againſt the Spaniſh company, excluding them from all their right in the mine of Guadalcanal, and granting the ſame to lady Mary Herbert, for the term of thirty years, to her and her heirs, &c. under the ſame conditions, and with the ſame proviſos of continuing the works at her own expenſe, within the term of two years, of which her ladyſhip afterwards obtained a prolongation, but never appeared any further in this buſineſs, though her agents ſpared no pains to procure new adventurers, and proſecute their ſchemes. In 1736, Mr. Gage obtained, in his own name, from the court of Spain, a grant of the mine of Cazalla, which is called *Mina de Puerto Blanco*, where they continued working till 1746; and though it produced ſome very rich mineral, with large quantities of ſilver,

ver, it never anſwered the expenſe, added to the plunder of agents and ſervants, particularly after the death of Mr. Richard Weſtley, an Engliſhman, on whoſe ſkill they chiefly depended. Moreover the buildings of both mines were robbed of the timber and materials, by the inhabitants of the adjacent villages, who, living in a remote part of the country, did every thing with impunity, as no effectual methods were taken to prevent it; all theſe misfortunes contributing to ruin the mine as much as the water; while the event of the *ten pounds thirteen ounces* of fine ſilver, having been printed by authority and circulated abroad, kept up its reputation in thoſe remote kingdoms, where they were at too great a diſtance to know the real ſtate of the caſe, and only ſaw the favourable ſide of the queſtion. In the year 1767, Mr. Thomas Sutton Count de Clonard, who is ſettled at Paris, made his propoſals to the court of Spain. The Spaniſh council of commerce and mines being well informed that lady Mary Herbert, on account of her great age and other reaſons, was not in a ſituation of fulfilling her contracts, was willing to grant the mines on the ſame terms to the Count de Clonard; accordingly, on the 27th November, 1767, a *cedula* or decree, was iſſued in his favour, granting him, for thirty years, the royal mines of Guadalcanal, Cazalla, and Galaroſa, declaring the former grant to lady Mary Herbert null and void, as well

as

as all her property therein. By virtue of this patent, the Count de Clonard formed a new company at Paris, in 1768, and in Auguſt the works were begun. Hydraulic machines were erected, and they drained the ſhafts very faſt; but the ruinous ſtate of the galleries requiring them to be ſupported anew, great delays enſued, in ſo much that the draining of the mine was not entirely compleated till July, 1774. They then made the fatal diſcovery, that there never exiſted a vein, or any appearance of ſuch in the tenth gallery, and that the event alluded to, had been a deception to draw in new ſubſcribers to indemnify former loſſes. This has been a dear-bought experience to the French, who had erected conſiderable buildings at the mine; particularly at Cazalla, where they had built large furnaces, and a machine for grinding inferior ore, at a league and a half diſtance, on the rivulet of Gueſna. There is no doubt however that the former adventurers muſt have obtained great quantities of very rich mineral, as is evident by the excavations from the ſurface, down to the fourth gallery, which diminiſhed towards the eighth, the total depth of the mine being 1200 Caſtilian feet. The chief engineers are of opinion the antients had great ſucceſs down to the fourth gallery, and that there, as the vein ſtruck off more obliquely to the South, they were deceived by a branch of the chief vein, which decoyed them as far

far as the eighth gallery, where it finiſhed; that from thence they proceeded at a great expenſe in queſt of the vein to the tenth gallery without ſucceſs, and then gave it up.

The preſent adventurers diſcovered a very rich mineral in the eighth gallery, which at firſt appeared to run a great length, but they were ſoon diſappointed, and only extracted 400lb. of mineral, though ſo rich, that ſome pieces produced at the rate of 70 to 80 per cent. and on a medium, have been rated at 50 per cent. ſpecimens of which were ſent to the court in November 1775, and are to be ſeen in the royal cabinet of natural hiſtory at Madrid, particularly one very curious ſpecimen, like an incruſtation of rubies, called *Roſicler* by mineralogiſts, from its roſe-colour appearance.

The preſent workmen have abandoned the old works at Pozo Rico, taken away their engines, and ſuffered it to fill up, and have applied towards the North, on the direction of the vein from North to South, and in a gallery undertaken two years ago in that part, have diſcovered appearances which flatter them with ſucceſs, when they come to a point where ſeveral veins reunite.

Their works at Cazalla, where they have extracted ſome rich mineral, though in ſmall quantities, deviate from the former operations, and are upon

upon a new plan, propoſed by Mr. Duhamel a French engineer, who gives them great hopes, according to all principles of the art; but for the carrying this on, no leſs a ſum is required than 600,000 livres; (£. 25,000 ſterling) the ore which has been ſmelted hitherto at the new foundery, on the river Gueſna, has only produced 4852 ounces of refined ſilver,* an inconſiderable ſum for ſo great an undertaking, attended with ſuch an extraordinary expenſe. This is the actual ſtate of the celebrated ſilver mine of Guadalcanal; how far their future operations will be crowned with ſucceſs, time only will diſcover.†

* 4852 ounces of ſilver, at the rate of five ſhillings per ounce, would only be 1213l. ſterling.

† There is no doubt but that the diſcovery of mines, and their being brought to perfection, is entirely due to the ſpirit of enterprize amongſt individuals, and that the public is frequently benefited by their labours, though private perſons may be prejudiced by injudicious and extraordinary expenſes. Whatever may happen to the French in this purſuit, the inhabitants of Eſtremadura however have nothing to fear on this ſcore; nor has the ſpirit of mining made any great impreſſion amongſt them. Don Antonio Ponz relates, with much humour, the notions of the country people in thoſe parts about mines, when being in the Sierra de Gat, and ſpeaking to his landlord on the ſubject, he anſwered him, "What, Sir, are you alſo one of thoſe ſtrollers who lately came here in queſt of mines in theſe deſert countries: Ah, Sir! the only mines here are hard labour, and ſpare diet. I ſaid as much to thoſe people at the

LETTER VIII.

Remarkable objects in the courſe of a tour from Guadalcanal to the city of Seville.

IN travelling to the eaſtward from Guadalcanal you come in two hours to the town of Alanis, which gives its name to a lead mine about half a league diſtant from it to the ſouth eaſt, which at preſent is entirely abandoned. The vein is perceived in the middle of a field, being about two feet broad, and riſing that height above ground. Its direction is from ſouth to north, cutting the hard ſlate that oppoſes it, as well as the calcareous ſtone with which that country abounds. It is of a dark colour, and ſo tough as to require thirty hours in calcining. The ancients followed this vein with a gallery from ſouth to north, but the moderns have only worked one branch of it which ſhoots off towards the weſt. Theſe veins may have flattering appearances, but are generally deceitful,

the time, though they aſſured me that they had diſcovered an iron mine, and that we ſhould all ſoon be rich! But alas! they wore out their cloaths, ſpoiled the fine ſilk ſtockings they brought with them, found out their miſtake, and marched off, while I remained quiet at home as before." Viage de Eſpana. Madrid, 1778.

ceitful, though at firſt the quartz may contain pyrites, but lower down they generally terminate in lead.

Going forward from this place brings you to Cazalla, where there is a mine about half a league from the town, at a place called Puerto Blanco. The vein does not appear above ground, but a few feet from the ſurface there is a ſtratum of extraneous earth, different from the other earth ſeen hereabout. In this mine they find virgin ſilver, copper pyrites in the quartz, and a little iron.

Two leagues and a half from Cazalla, there is a high mountain called *Fuente de la Reyna*, where the Conſtantina mine is to be ſeen, ſo called from a village of that name, about two leagues diſtant, and not derived from the Emperor Conſtantine, who never was in Spain, nor was the founder of it, according to the popular error which prevails on that ſubject. In former times this mine was worked with great judgment, as appears from the remains of their ſhafts and galleries. The vein runs from north to ſouth acroſs the direction of the ſlate, and as the miners term it, has its hat of iron, with pyrites and blend of ſilver and lead in the ſpar. Lower down they found ſilver, called by the Spaniſh miners *Plata belada*, "froſted ſilver," and a mine of lead in a ſmall teſſellated form. Some years ago an inhabitant of Conſtantina undertook

the working of this mine, ſunk two ſhafts, and made galleries on the top of the hill, but abandoned it ſoon after, perhaps for want of ſkill, or ſufficient capital to go on with the works, though it was thought to deſerve more attention, as the ore was good, and they had fuel at hand with a brook at the foot of the mountain, in a fruitful country, with plenty of vineyards.

Two leagues to the weſtward of Cazalla, there is a copper mine, at a place called *Canada de los Conejos*, which from its appearance ſhould be rich, the vein running from north to ſouth in a pyritous quartz. Half a league from Cazalla there is a mine of vitriol, at a place called *Caſtanares*, from the number of cheſnut trees growing there. The ſtone is pyritous and ferruginous with deep efflorescencies, or ſpots of a greeniſh yellow, and a kind of white powder, which is vitriol diveſted of the water that cryſtaliſes it.

After croſſing a mountain, two leagues in length, to the weſtward of Cazalla, where there are four ſorts of the ciſtus, the terebinthus and other plants ſimilar to thoſe on other hills in this country, you come to a little village, called *El Real de Monaſterio*. Half a league from this place, there is a mine of black lead proper for pencils, a ſpecies of the *molybdena*, but not of the true ſort of *molybdena nigrica fabrilis*, like that from Cumberland, ſo famous abroad,

abroad, that in France it goes by the name of *crayon d'Angleterre*; they give the name of *lapis*, in Spain, to thoſe black lead pencils, a term they likewiſe apply very improperly, to black chalk uſed for drawings, which is a ſoft ſtone, called *ampelitis*.

The country about Monaſterio abounds with good oak, of which there is a wood of a league ſquare, with a great many cork trees, from which they ſtrip off the bark every four years, as far as a white ſap which they leave on the tree. A liquid humour afterwards iſſues out again, which thickens with the ſun and air, and forms a new bark in about four years more. When the bark is taken off, it is piled up in a pond or ditch, and loaded with heavy ſtones to flatten it, and reduce it into tables, from whence it is taken to be dried and tied up in bundles for exportation, being then in a proper ſtate for the different purpoſes for which cork is applied.*

* Mr. Bowles, ſpeaking of the cork tree, page 67, ſays, That every four years they peel off the bark as far as the epidermis, "De quatro en quatro anos ſe le deſpoja de ſu corteſa haſta el epidermis," which muſt be a miſtake, as the epidermis is the outward ſkin or bark. He ſhould have ſaid, "haſta al albura," as far as the white ſap or ſappy part. *Alburnum*. His French tranſlator Le Vicomte de Flavigny has followed him verbally and literally on every occaſion.

"Tous

There is a great variety of oaks in Spain, the *roble* is the common Engliſh oak with a bitter acorn. The *querigo* is a cheſnut-leaved oak, alſo with a bitter acorn. The *encina* is the ilex, or evergreen oak, and has a ſweet acorn, being a ſtately tree, the wood of which is very ſolid and hard, but its roots are leſs ſo, and are uſed by turners. The acorns are large and delicate, and ſo palatable as to find a place at the table in preference to cheſnuts. Another ſpecies of the ilex has a gloſſy leaf with ſweet acorns, but longer and more pointed than the others; the country people know very well how to diſtinguiſh the former from the latter, by the ſhape of the leaf. Mr. Bowles ſaw a ſpecies of ilex in Catalonia very ſingular, being only ſix inches high, yet had fifty-three acorns as large as hazle nuts.§ The *meſto*, is ſo called as it partakes of the *encina* and *querigo*, and has a bitter acorn as well as the *alcornoque* or cork tree.

From

" Tous les quatres ans on le depouille de ſon ecorce juſqu'a lépiderme, page 95. See Introduction a l'hiſtoire naturelle et a la geographie phyſique de l'Eſpagne traduite de l'original eſpagnol de Guillaume Bowles." Par le Vicomte de Flavigny. Paris, 1776.

§ Mr. Bowles ſays he can give no account of the *Eſculus* of Spain, nor its acorns ſo celebrated by Pliny, who was intendant of Andaluſia, and adds, it is a difficult matter to deſcribe thoſe acorns which were eaten in the golden age; nor has Don Quixotte defined them in his immortal diſcourſe to the ſhepherds on that remarkable period. Don Guillermo Bowles, page 236.

From Real de Monaſterio it is a journey of three hours to Callero, about a mile from whence there is a round inſulated hill, capped with a vein of calcareous ſtone running from North to South, where there are both white and grey loadſtones, their being of either of theſe colours is of no conſequence, as it depends on the iron being more or leſs diſperſed in ſmall grains; if it is much ſo, the loadſtone is white, if otherwiſe, abundant, compact and ſo that the air may have diſcovered its particles, then it is red without and grey within. There is alſo an iron mine diveſted of any magnetic quality. The whole country is covered with oak and cork trees, ſome of which are ſo bulky as to be 50 feet diameter, but moſt of them as well as the oaks, are hollow within, from having been improperly lopped.

Leaving Cazalla and croſſing ſeveral bleak mountains, it requires nine hours to reach Cantillana, on the banks of the Guadalquivir, the Sierre Morena terminating three leagues before at the narrow paſs of Montegil. After croſſing the river at Cantillana the face of the country is totally changed; the terebinthus, ciſtus and lentiſcus are ſeen no more, nor the mountainous plants obſerved before between Almaden and this place, from whence one may conclude that hitherto the ſoil was much of the ſame nature, for in coming from the Pyrenees

Pyrenees to the ſouthward, theſe ſierras are common, but going northward towards France, it is juſt the reverſe, and no real mountains are to be ſeen in the interior parts of that kingdom, the country conſiſting chiefly of ſtrata of earth one over the other.

An extenſive plain reaches from Cantillana to the city of Seville, which requires five hours to paſs over, conſiſting of poor land, without any ſtones, but producing a great deal of dwarf palm, or palmetto, the *chamærops humilis* of Linnæus, which covers the ground like fern: the leaves being tied together ſerve to make beſoms ſufficient to ſupply the whole kingdom; * two ſorts of wild aſparagus alſo

* A very accurate modern traveller, having given a curious account of thoſe parts of Spain which he viſited, with a very circumſtantial detail of the Palmetto, I preſume the following extract from his entertaining and intereſting work will not be unacceptable: "The Campina of Marvella, he ſays, produces an amazing quantity of palmettos, with little dates exceedingly good; they grow in cluſters at the root of the ſhrubs of the ſize and ſhape of a plumb, of a reddiſh colour, bearing a large ſtone like the great palm tree date; the root of the palmetto is very curious, round it are ranged the ſtamina of each branch of leaves, with a double coating of dry brown fibres, netted like lace, and which are capable of being ſpun and uſed as ſtrong thread. Nature, by ſuch extraordinary care in preſerving the root of the palmetto dry and free from humidity, ſhews that a hard ſandy

alſo grow here with a very thin ſkin, one green and the other white, which before they bud their leaves have a multitude of flowers as white as ſnow. In this plain there is a great number of olive trees, whoſe trunks are ſcarcely any thing better than bark, from their bad method of planting theſe trees, they doing no more than taking a ſtake of an olive tree, of the ſize of one's arm, ſlit at the bottom ſix inches into four parts; they put a ſtone between the ſlits, and then ſet it about two feet under ground, making a trench round it to keep in the water; the top of the ſtake being uncovered, the rain penetrates that way, and by degrees with the warm air rots the inſide.

The

ſandy ſoil, little rain, and a hot ſun, are neceſſary to the welfare of this plant; each plant ſhoots up to the height of ten or fifteen inches, and in a few days after it has attained its growth, divides and ſpreads itſelf like a fan into fifty long thin leaves that concenter in the ſtem. They are of a deep green, exceedingly tough, eſpecially the ſtalk, which is armed with prickles. They uſe them as brooms, and eat the fruit which is very delicious, and no way inferior, except in ſize, to the palm tree date. The root, which is thick and eight inches long, is not only wholeſome food, but very palatable, and eat with eagerneſs by the common people. The inſide is tender and ſweet, though accompanied with a bitterneſs, diſagreeable to thoſe who are not uſed to it. The young ſhoots, pregnant with ſeeds, are juicy and pleaſant." One root may contain two pounds of food. See journey from Gibraltar to Malaga, by Francis Carter, Eſq. London, 1777.

Puertos to the southward, these terras are common, but going northward towards France, as all the reverse, and no real mountains are to be seen in the interior parts of that kingdom, the country consisting chiefly of plains of earth one over the other.

An extensive plain reaches from Cantillana to the city of Seville, which requires five hours to pass over, consisting of poor land, without any stones, but producing a great deal of wild palm, or palmetto, the *Chamærops humilis* of Linnæus, which covers the ground like furz: the leaves being set together are so much esteemed to support the vines in gardens, * two sorts of wild asparagus

and

* [illegible] I am informed that many parts of Spain which are [illegible] with the abundance of the Palmetto. I presume the following extract from his entertaining and interesting work will not be unacceptable. "The Common or Palmetto, in its greatest perfection, grows in bushes of the size of the furze, or the fine sea grass of a sandy shore. [illegible] the top of the bushes is very small, with [illegible] the leaves of each bunch or stem, with a little [illegible] the stem, which has also small [illegible] at every joint. Some of this sort are [illegible] long. Another [illegible] the common sort, but [illegible] the leaves [illegible] and [illegible]

[illegible]

The antient and famous city of Seville has been fully deſcribed by modern travellers; its ſtreets are paved with pebbles brought from a great diſtance, for there are none hereabouts. The old Roman walls which are of earth are now ſo well cemented, that they are become as hard as ſtone. In the Alcazar, a palace built by king Peter in the fourteenth century, there are baths deſigned for his favourite Dona Maria de Padilla in a retired ſituation ſhaded with orange trees, which ſtill continue to give fruit. The *Solano* wind or South-eaſt, is very troubleſome here and all over Andaluſia, turning the head and heating the blood in ſuch a manner as to cauſe various exceſſes, and were not precautions taken to prevent its effects, they would ſtill be more ſenſible in youth of both ſexes. In the winter ſeaſon ſtorks are very numerous in Seville, almoſt every tower in the city is peopled with them, and they return annually to the ſame neſts. They deſtroy all the vermin on the tops of the houſes, and pick up a great number of ſnakes, ſo that they are welcome gueſts to the inhabitants, and looked upon with peculiar veneration. It is ſaid in ſome parts of Spain, that if they do not appear by St. Agatha's Day, (the fifth of February), the people fling ſtones at them when they come, and drive them away. The cathedral of Seville is a fine gothic building, with a curious ſteeple, or tower, having a moveable figure of a woman at top, called *La Giralda*, which

which turns round with the wind. This ſteeple is reckoned one of the greateſt curioſities in Spain, and is higher than St. Paul's in London. * The firſt clock made in the kingdom was ſet up there in preſence of king Henry the IIId. when the oldeſt clock we have in England that is ſuppoſed to go tolerably well, is in the palace of Hampton Court, and of the year 1540. † Nothing can be more delightful than the proſpect of the country round Seville, beheld from the ſteeple abovementioned, its beautiful and fertile plains, with its delightful gardens and orange groves, convey every idea of fertility and pleaſure, with the addition of the river Guadalquivir, which brings ſhips up to the walls of the city. Amongſt other fiſh which this river af-

* This beautiful tower is 350 feet high. St. Paul's in London, 344. St. Mark's, at Venice, 337 feet. Saliſbury ſteeple, 400 feet; and St. Peter's, at Rome, 432 feet. The traveller who looks on the tower of Seville, will then underſtand the following paſſage of Don Quixotte, tom 3, page 162. Madrid, 1771. "Una vez me mando que fueſſe a deſafiar a aquella famoſa giganta de Sevilla llamada la Giralda, que es tan valiente y fuerte como hecha de bronze, y ſin mudarſe de un lugar es la mas mas movible y voltaria muger del mundo." "—She once ordered me to "challenge that famous giant of Seville, called the Giralda, "ſo valiant and ſtrong as being of braſs, and yet without "moving from its place, is the moſt fickle and variable crea-"ture in the world".——

† See obſervations on clocks by the Hon. Daines Barrington, in the 5th volume of Archaelogia.

affords, they catch ſturgeon, which is greatly eſteemed, and in Lent is ſent up to Madrid by the dean and chapter of the cathedral, for the king's table on Good Friday, ſturgeon being ſtill conſidered a royal fiſh as in the days of the Romans, as the Spaniſh poet Martial has ſaid :

Ad Pallatinas accipenſes mittite Menſas,
Ambroſias ornent munera rara dapes. Lib. 13.

LETTER IX.

Extraordinary qualities of the River Tinto, with ſome account of the copper mine of Rio Tinto in its neighbourhood.

ABOUT fourteen leagues from Seville on the frontiers of Portugal, and on the banks of the river Tinto, ſtands the village of Tinto, which has alſo given its name to a celebrated and very ancient copper mine that is near it. It muſt have been greatly eſteemed by the Romans as may be judged from the conſiderable remains of their works ſtill to be ſeen, which Alonſo Carranza has fully deſcribed, adding that theſe mines were not worked in his time, though the remains of the furnaces were found capable of containing four or five hundred quintals of ore, being much larger than

than any uſed in Spain or the Weſt Indies; the country all round is covered with ſlag. In the year 1725, a grant of this mine was made by the court to Mr. Liebert Wolters a Swede, who drained the mine of the water, and after that ſpent large ſums of money which he had raiſed by ſubſcription to very little purpoſe, and died two years after the grant had been made to him, leaving his intereſt to his nephew Manuel Tiquet, who continued the works with better ſucceſs, diſcovered the vein of copper, and eſtabliſhed a manufacture of vitriol of copper of the beſt ſort: but Tiquet had not the good fortune to ſurvive theſe promiſing appearances, he died in 1758, and left every thing to his mother and two ſiſters, the mine being at that time in a flouriſhing ſtate, producing enough to defray all charges, as well as the engagements entered into for the benefit of the undertaking, having furniſhed annually for the laſt ten years about one hundred and forty thouſand pound weight of fine copper, which ſold for 4 ½ reals vellon, (about 1s. 4d. ſterling) per pound, and paid one thirtieth part duty to the king. The heirs of Tiquet not having received any advantage from the mine, have complained to the court, and new orders have been given to make an inventory of the whole, and report its preſent ſituation, when the actual value of this mine will be more accurately known. Don Guillermo Bowles did not

not go there, though invited by the adminiſtrator thereof; however he aſſerts that the copper is difficult to fuſe and has a mixture of iron ore, which the miners of Rio Tinto will not agree to; ſo far from it, they boaſt of its quality, and even flatter themſelves it may contain gold, according to the report of the aſſay maſter when the contract was made, which is ſtill to be ſeen amongſt other papers depoſited in the archives of the royal mint at Segovia. Thoſe concerned at preſent are all Spaniards, and no foreigner has any intereſt therein, or any emolument therefrom, except what might have ariſen to ſome few individuals for manual labour in the mine, but now it is entirely worked by Spaniards, and produces excellent copper. A very curious plate of copper was diſcovered by the workmen in this mine, on the 31ſt of July, 1762, three feet long, and two broad, which was found buried ninety feet under ground, and has the following Roman inſcription.

IMP. NERVAE. CAESARI. AVG.
PONTIFI. MAXIMO. TR...
OTEST. PP. COS. III.
G. IIII. PUDENS AVG. LIB.
...PROCVRATOR
IO. POSVIT.

The river Tinto is equally one of the great curioſities of this place. It riſes in Sierra Morena, and

and empties itſelf into the Mediterranean near Huelva, having the name of Tinto given it from the tinge of its waters, which are as yellow as a topaz, hardening the ſand and petrifying it in a moſt ſurprizing manner. If a ſtone happens to fall in and reſt upon another, they both become in a year's time perfectly united and conglutinated. This river withers all the plants on its banks, as well as the roots of trees, which it dyes of the ſame hue as its waters, no kind of verdure will come up where it reaches, nor any fiſh live in its ſtream, it kills worms in cattle when given them to drink, but in general no animals will drink out of this river, except goats, whoſe fleſh nevertheleſs has an excellent flavour. Theſe ſingular properties continue till other rivulets run into it and alter its nature, for when it paſſes by Niebla, it is not different from other rivers, and falls into the Mediterranean ſix leagues lower down at the down of Huelva, where it is two leagues broad, and admits of large veſſels which may come up the river as high as *San Juan del Puerto* three leagues above Huelva. This country is remarkable for ſeveral events which make a conſiderable figure in the hiſtory of Spain. In the firſt place, Huelva is ſaid by ſome writers to have been the place of nativity of Juan Sanchez de Huelva, the perſon who is ſaid to have ſailed from the Canaries, and to have been driven by tempeſtuous weather on the coaſt of America, and after being

ing out ſeventeen days, was forced back to the Canaries, where meeting with Columbus, was hoſpitably entertained by him, and dying ſoon after of fatigue, communicated his diſcoveries, by which means that great navigator was further confirmed in his opinions about the new world, and encouraged to purſue them. § The writer who relates this event ſays, that while he was writing his book, a whale having being caſt aſhore in the night near Huelva, made ſuch lamentable groans, and frightened the people to ſuch a degree, that they imagined theſe hideous yells could only proceed from the bottom of hell, on which the friars of the convents *Delabella* and *Larabida* at Palos all ran to the churches, fearing every moment to be their laſt, however they were ſoon convinced of their ignorance. A deſcription was afterwards publiſhed of this whale, from whence it appeared, that it was ninety feet long and thirty feet high, a man could ſtand upright in its mouth, and there was eight feet diſtance between its eyes. But theſe are not objects to perpetuate the memory of Palos, or the

§ See Antiguedades de Sevilla por Rodrigo Caro. Sevilla, 1634, who does not tell us on what authority he relates this event of Juan Sanchen de Huelva, which would have been an anecdote of ſome curioſity; for want of which we may join with Dr. Robertſon, who ſays, that the name of the pilot is alike unknown as well as that of the port in which this ſuppoſed perſonage landed on his return. Dr. Robertſon's hiſtory of America. Vol. 1. Note 17.

the fryars of Larabida, more ſtriking events have handed down their name to poſterity; even the ignorant convent of Larabida was at one time governed byone of the moſt enlightened characters of the age, and to whom the Spaniſh monarchs had the greateſt obligations; this perſon was Juan Perez, prior of Larabida, the intimate friend of Columbus, who after that great man had received his final anſwer from court, ventured to write again to Queen Iſabella in his favour, and by his intereſt, and perſuaſion engaged that princeſs once more to conſider his caſe: the arguments of Perez were drawn up with ſuch ſtrength of reaſoning and ingenuity, that he was ordered to attend the court to confer with the miniſtry on that ſubject, the reſult of which was the final ſettlement of his plan in behalf of his friend, whoſe children were at ſchool under his tuition, and the little port of Palos, as moſt pleaſing to them both, was fixed upon for that ever memorable expedition, from whence Columbus ſailed in 1492, in queſt of a new world for the crown of Caſtile, verifying that enthuſiaſtic prediction of Seneca,

Venient annis
Sæcula ſeris, quibus oceanus
Vincula rerum laxet, et ingens
Pateat tellus, Tiphyſque novos
Detegat orbes, nec ſit terris
Ultima Thule!

SENECAE MEDEA.

LETTER

LETTER X.

A tour into the kingdom of Jaen, with ſome account of its lead mines, more particularly that of Linares.

THE little fairy kingdom of Jaen, which now makes part of Andaluſia, is in a manner ſurrounded by a chain of mountains, formed by the Sierra Morena, Segura, Queſada, and Torres, ſeparating it from the kingdoms of Cordova, Toledo, Murcia and Granada, while the river Guadalquivir divides it from the kingdom of Seville. The face of the country is rugged and hilly, with no other vallies but ſuch as have been formed by torrents of water, according to the more or leſs reſiſtance of the ſoil, or the hardneſs of the rocks, for the earth not being divided in ſtrata the heights crumble away in proportion to their moiſture, and the tops of the hills not being connected nor contiguous, have decompoſed at a variety of periods, from whence thoſe ſingular gaps and paſſes have reſulted, which now form the roads in this petty kingdom, once the domain of a Mooriſh chieftain, and for a long courſe of years the theatre of chivalry, honour, and love.

In the centre of this cragged kingdom, about three quarters of a league from the village of Linares,

nares, there is a ſmall plain, ſituated in the higheſt part of the country, which affords an extenſive proſpect, cloſed by barren hills and ſteep rocks, with a view of the city of Jaen the capital, as well as thoſe of Anduxar, Baeza and Ubeda. At the end of this plain the hills are pierced like a ſieve, with numberleſs ſhafts and excavations of mines undoubtedly the work of the Moors, for ſurely the Romans could never have proceeded in ſo awkward a manner; theſe Mahometan princes muſt have ſtruggled hard to extract from the bowels of the earth thoſe revenues which its dreary ſurface refuſed them, and probably they ſupplied the neighbouring ſtates with ſilver, copper and lead; ſome of which minerals are always found here, and occaſionally all of them together. In ranging the hills it is extraordinary to obſerve the prodigious number of ſhafts made in direct lines at four paces diſtance from each other; there are above five thouſand of them, and no doubt the violence of the water guſhing through the hills firſt laid open the veins and led to the diſcovery of the mines, but when the Moors improved upon theſe advantages with which nature had favoured them, they did it with all the ignorance and unſkilfulneſs to be expected from their barbariſm. I ſhall only ſpeak of two of thoſe veins, one that begins in the valley on the Weſt ſide of the plain, and the other on the Eaſt. They each have a parallel direction, at

about a thouſand paces diſtance, running from North to South and incloſing the plain between them.

There are two other modern mines, but one of them does not enter into the plain, and the other is ſo low, that it will be difficult to work for any time, as there is no iſſue for the water, nevertheleſs the former miners extracted from hence the lead which was ſold to the king before his majeſty took thoſe mines into his hands, and one may ſee by their labours that they were exact imitators of their predeceſſors the Moors, following their method, and making the ſame range of ſhafts in purſuit of the vein on the hill, almoſt as far as the village of Linares.

No mine of the kingdom of Jaen is found in calcareous rock, that of lead abovementioned is in common grey granite, at times ſixty feet deep, at others only one; with every gradation between theſe extremes, the ſtratum in which the ore is enveloped is generally clay, though ſometimes it runs through granite which puzzles the miners for want of a regular method to follow it; however they are right in general when they tell us that regular veins have two ſtrata, one lying above called the roof, and the other underneath termed the floor, both together forming the trunk of the vein, it being thought the roof ſerves to cheriſh it, while the floor

floor anſwers the purpoſe of a baſis: in Jaen they ſometimes find the ore in fragments or maſſes, for which no certain rules can be given; it is fortunate to meet with theſe maſſes, Don Guillermo Bowles ſays that one was found in his time, ſo remarkably rich that in four or five years it yielded an extraordinary quantity of lead, in a ſpace about ſixty feet broad and as many in length; adding that though he did not recollect the exact number of quintals, he could aver that more lead was obtained from that ſingle place, than from the mines of Freyberg in Saxony, or thoſe of Clonſthal in the mountain of Hartz, in the courſe of twelve years. It is a true *Galena*,* of a large grain, yielding from 60 to 80lb. of lead per quintal, and they fuſe it in the open air for want of a laboratory at Linares.

The firſt uſe made of the lead is to run it into ſhot of all ſizes for ſportſmen, which is ſold every where in Spain for the king's account. The potters are next ſupplied, who uſe it to varniſh their wares, another part is pulverized for writing ſand, the remainder is ſent to France and ſold at the fair of *Beaucaire*: though it is a *Galena*, as it only contains

* Galena is the name of a lead ore conſiſting of cubic particles, and ſometimes teſſallated. It is the moſt common ore of lead, if the cubes are large the mineral is richeſt, and when ſmall and grey, contains a little ſilver, but in ſuch ſmall quantities, as not to be worthy of notice.

tains three quarters of an ounce of ſilver per quintal, it is not worth while to copel it.

The country produces the ſame kind of plants as at Almaden, to which may be added the common or wild camomile, a plant generally ſcarce in the meridional provinces, yet ſo common here that the whole kingdom might be ſtocked with it: they have alſo great plenty of game.* This little kingdom is famous in the annals of Spain for that memorable victory at *las Navas de Toloſa* in 1212, over the king of Morocco, obtained by Alfonſo the IXth king of Caſtile, aſſiſted by Peter the IId king of Aragon, and Sancho VIIth king of Navarre, in which an incredible number of Moors were deſtroyed. After the battle the king gave orders to his general Don Diego Lopez de Haro who commanded the van of the army, to diſpoſe of the booty, as the kings of Aragon and Navarre had conſented to abide by his deciſion, upon which the gallant General, knowing the magnanimous diſpoſition of his ſovereign, decreed, that the kings of Aragon and Navarre ſhould have whatever was found within the chains and paliſades of the enemy's

* When Mr. Bowles travelled this way, at a miſerable venta they gave him an omelette for dinner made with partridge's eggs, and they ſhewed him five hundred of thoſe eggs in the houſe for the ſame purpoſe. Every peaſant is a ſportſman and has the uſe of his gun, for game laws are unknown.

my's camp, the remainder of the ſpoil to the ſoldiers in general, and for the king his maſter what he thought the moſt honourable of all, *The glory and honour of the day.** This commander having been reflected upon for having juſt before loſt the battle of Alarcos, out of jealouſy, becauſe the king of Caſtile had ſaid the nobles of Eſtremadura were as good as thoſe of Caſtile; his ſon Don Lopez Diaz de Haro, came to him the eve of the battle of Toloſa, and ſaid, Sir, I hope you will not ſuffer me to-morrow to be called the ſon of a traitor; No, replied the general with warmth. *Llamarte an hijo de puta pero no hijo de traydor*,† which ſharp anſwer proceeded from the conduct of the lady Maria Manriquez his

* The king of Navarre being the firſt who broke down the chains of the Mooriſh camp, altered his coat armour in memory of that day, to a field gules traverſed with a chain of gold, having a rich emerald in the centre, being part of the ſpoil, and a piece of the chain was fixed round his tomb in the church of St. Mary at Roncevalles. Many Spaniſh knights did the ſame, or added chains to their arms from having been preſent on that memorable day, particularly thoſe of the names of Romeu, Mendoza, Stuniga, Munoz, Peralta, Meneſes, Maza, Abarca, Villaſeca, Otazo, and Irrazaval de Vergara. The royal ſtandard of the king of Morocco, which is *azur* with a creſcent *argent* and five ſtars *or*, was ſuſpended over the tomb of Don Diego Lopez de Haro, in the choir of the cathedral of Toledo.

† "They may call you ſon of a w----, but not ſon of a traitor."

his wife, who fled from her huſband with a black-ſmith of Burgos, but afterwards repented, and by way of atonement in her laſt moments ordered her corpſe to be placed with her effigy in marble, without the church door of the convent of Haerta, that every one might trample on her tomb, and take warning from her weakneſs, which being long after obſerved by the Emperor Charles, he ordered her remains to be removed into the church with her anceſtors, ſaying ſhe had now done penance enough.

A more fatal inſtance of love is recorded in the chronicles of Jaen, which the Spaniſh bards have made a perpetual theme of their ditties, lamenting the fate of that unfortunate lover *Macias* the poet, one of the eſquires of Don Henrique de Villena, grand maſter of the order of Calatrava.* It ſeems Don Henrique had a beautiful handmaid who had given great encouragement to Macias, who on his ſide had improved every opportunity from the fair object of his love, and although the grand maſter had diſpoſed of her in marriage to a principal gentleman of Porcuna in the kingdom of Jaen, it had little effect on their mutual affection, which being reported by the huſband to Don Henrique de Villena, he, finding all admonition vain, caſt Macias into priſon at Arjonilla, a town belonging to the knights of

* Don Henrique de Villena died in 1434.

of his order, five leagues from the city of Jaen, where the diſtracted enamorato had no other alleviation than writing letters to his miſtreſs, and compoſing love ſongs in her praiſe, replete with the moſt tender expreſſions, as well as the hardſhip of his fate, which reaching the jealous ears of her huſband, he mounted a fleet courſer, and armed with his lance, rode up to the windows of the priſon, where fired with reſentment on hearing the name of his wife, he darted his lance at him with fury, and pierced him through the heart, then clapping ſpurs to his horſe, fled into Grenada. The unfortunate Macias was honourably interred in the chapel of St. Catharine belonging to the caſtle of Arjonilla, and the bloody lance was ſuſpended over his tomb, with the following inſcription:

Aqueſta Lanza fin falla
Ay coytado!
Non me la dieron
Del muro,
Nin la priſe yo en batalla
Mal pecado!
Mas viniendo a ti ſeguro,
Amor falſo y perjuro,
Me firio, e ſin tardanza,
E fue tal la mi andanza
Sin venturo!

LETTER

LETTER XI.

Journey from Merida to Malaga.

IT is a journey of ſeven hours from Merida to Talavera* through a ſandy plain traverſed by the Guadiana, which has a great many iſlands covered

* Different from *Talavera de la Reyna* on the Tagus in New Caſtile, famous for its fine earthenware and ſilk manufacture: theſe belonged to the crown till ſold in 1762, to a merchant of the name of Uſtariz, for 7,410,000 reals vellon, £83362 10*s.* ſterling. Their annual conſumption is 21000lb. of ſilk, 4000 marcs of ſilver and 60 of gold, having 336 looms and about 1438 workmen, chiefly Spaniards. They make annually 55000 varrs of gold and ſilver lace, 560000 varrs of ribbands, 5000 pair of ſilk ſtockings, 32000 varrs of taffety, 8200 varrs of velvet and velverets, 2300 varrs of gold and ſilver ſtuffs, 2000 varrs of velverets mixed with ſilk, 10500 varrs of damaſks, tabbies, &c. excluſive of gold and ſilver twiſt buttons, handkerchiefs and other leſs articles. The greateſt encouragement is given to the raiſing of mulberry trees for the ſilk worms; many plants of which have been diſtributed by the proprietor, at his own expenſe, to all the villages round him.

They have remarkable proceſſions here at Eaſter, which go by the name of *mondas de Talavera*, when all the country people aſſemble and form a proceſſion with garlands of flowers,

ed with flocks of ſheep and numerous herds of cattle, that are often carried away as well as the ſhepherds by the ſudden increaſe of the river: the plain from Talavera to Badajoz produces nothing but broom. At this laſt city the ſoil changes again, and the calcareous earth, ſtone, and rocks make their appearance once more. Eſtremadura is the only part of Spain where they have neither ſalt ſprings nor rock ſalt, which obliges the inhabitants to procure thoſe articles from their neighbours. This large and fertile province, reputed about fifty leagues in length and forty in breadth, ſo happily ſituated for every branch of culture, and where the Romans ſeem to have taken ſuch delight, is now thought not to contain above a hundred

flowers, each diviſion guided by a perſon carrying a ſtaff covered with flowers at top, and making an offering of them to the Bleſſed Virgin, according to the cuſtoms of the Pagans who uſed to do the ſame to their gods; perhaps the difficulty of aboliſhing theſe ceremonies, ſays Don Antonio Ponz, has engaged the clergy to convert them into obſequious rites to the Bleſſed Virgin, as the church has wiſely done with other heatheniſh cuſtoms equally difficult to eradicate. Viage de Eſpana tom. 7. Madrid 1779.

Two leagues from *Talavera de la Reyna* you find *Talavera la Vieja*, famous for the remains of a temple as well as ſeveral Roman inſcriptions and other antiquities, which have been deſcribed and publiſhed with copper plates, at Madrid, in 1762, by Don Ignacio de Hermoſilla of the ſecretary of ſtate's office for the Weſt India department.

hundred thouſand inhabitants, a number compriſed in many capital cities; but if their numbers are ſmall, they value themſelves on the quality of their heroes, having furniſhed a Cortez, a Pizarro, and the unfortunate though great Velaſco Nunez de Balboa. *

The antient city of Badajoz the *Pax Auguſta* of the Romans, called *Badaugos* by the Moors, and now Badajoz is the frontier town next to Portugal. The bridge over the Guadiana has twenty-ſix arches, and was built by Philip the IId. Numerous families of Negroes and Mulatoes are ſettled in this country between Badajoz and Zafra: this laſt town with the dutchy of Feria is now fallen into the ducal houſe of Medinaceli. Joining to the duke's palace, in a church belonging to a convent of nuns, there is an elegant marble monument to the memory of an Engliſh lady of the noble family of Harrington, with the following inſcription:

AQUI YACE DONA MARGARITA HARRINTON HIJA DE JACOBO HARRINTON BARON DE EXTON, Y DE DONA LUCIA HIJA DE GUILLERMO SIDNEI VISCONDE DE LISLE, BARON DE RENHURST, NACIDA EN INGLATERRA, MUGER DE DON BENITO DE CISNEROS,

* See the character of Nunez de Balbao in Dr. Robertſon's hiſtory of America,

NEROS, CUYAS SINGULARES VIRTUDES PUDIERAN HAZERLA INSIGNE QUANDO LE FALTARAN TANTOS TITULOS DE NOBLEZA PARA SERLO. ROGAD POR ELLO A DIOS. MURIO EN MADRID ANNO DE 1601.

DONA JUANA DE FERIA, PRIMA, ALBACEA Y PATRONA, EN CUMPLIMIENTO DE SU AMOR Y DEL TESTAMENTO MANDO HAZER ESTA CAPILLA Y SEPULTURA.

In ENGLISH.

Here lies Margaret Harrinton, daughter of James Harrinton, Baron of Exton, and of Lucy, daughter of William Sidney Viſcount Liſle, Baron of Renhurſt, born in England, Wife of Don Benito de Ciſneros, whoſe ſingular virtues would have rendered her illuſtrious, even if her many other titles had been wanting. Pray to God for her. She died in Madrid in the year 1601.

The lady Jane de Feria, couſin, executrix, and patroneſs, as a proof of her love, and in compliance with the will, ordered this chapel and monument to be erected. *

* There ſeems to be ſome error in this inſcription, it was John Harrington, who the firſt of James I. was created baron Harrington, of Exton, in 1613. He died at Worms in Germany, his iſſue John ſurvived him but a few months; nor does it appear that Sir William Sidney, of Penſhurſt in Kent, was ever raiſed to the peerage, though his deſcendants

Proceeding from Zafra to Stª. Marta the country improves for about five leagues to Zarza del Angel, then you paſs by Monaſterio to Fuente de Cantos where the Sierra Morena begins: Stª. Olalla

ſcendants might have had the title of Viſcount Liſle and Baron of Penſhurſt.

Dona Juana de Feria was the only daughter of Sir William Dormer by his firſt wife Mary Sidney, whoſe youngeſt ſiſter was mother of Margaret Harrington. She was maid of honour to queen Mary, and when the Conde to Feria came into England as ambaſſador to the queen in her laſt illneſs from Philip the IId, he fell in love with this lady, and married her, and they had a ſon born at Mechlin, September 28th, 1559. The Conde was made a Duke eight years after, and died in 1571: and the family is now extinct. A picture of the Dutcheſs of Feria, ſuppoſed to be of the hand of Sir Antonio More, is in the poſſeſſion of the Rev. Mr. de Salis. She is in the dreſs of a nun, with this inſcription on it, D. Jana Dormer Feriæ Ducisſa Vidua D. Gomeſii Suarez de Figueroa y Cordova Feriæ Ducis æt. 35. A. D. 1572. As ſhe retired into a convent the year after her huſband died, perhaps this might be the reaſon that ſhe did not aſſume the title of Dutcheſs on the monumental inſcription to the memory of her couſin Margaret Harrington, who probably went to Spain with her. The Jeſuit Ribadeneira, who came into England with the Conde de Feria, as his chaplain, but principally with a deſign to procure a ſettlement here for his order, continued his attachment to the Dutcheſs of Feria, and dedicated to her his ſecond volume of lives of ſaints, which is dated at Madrid June 15, 1608. I am indebted for this communication to my worthy friend the Rev. Mr. John Bowle, of Idmiſton.

la is the firſt village in the kingdom of Seville, it being a diſmal and melancholy journey of ten hours over theſe dreary hills to Caſtel Blanco, with the ſame plants as at Almaden, to which may be added the wild germander. Great efforts have been made to improve the waſte lands of this horrid Sierra, and give a new face to the country, for which purpoſe foreigners have been invited to ſettle there, and great exertions have taken place for ſome years paſt. In the year 1767, eleven towns and five villages were already formed in the Sierra Morena, as well as four towns and fifteen villages in that part which divides the kingdom of Cordova and Seville,* making all together 2446 families, conſiſting of 10490 perſons, of which 8175 were labourers, and 2217 mechanics, excluſive of journeymen and ſervants. They have built twenty-four pariſh churches and chapels, 2200 houſes, and fifteen inns, planted 200,000 olive trees, above half a million of mulberry trees, and as much more of various kinds of fruit-trees, elm, vine, &c. their harveſt conſiſts at preſent chiefly of wheat, barley, peas and beans, producing one year with another five hundred thouſand *fanegas*; the vines begin to proſper, and are expected

* See in Mr. Swinburne's travels, a deſcription of the new ſettlement of La Carolina, one of the principal places of this eſtabliſhment, which he paſſed through going from Cordova to Madrid. Many of theſe people are ſince dead through intemperance and and change of climate.

expected to become a conſiderable object, and they have moreover eſtabliſhed many branches of ſilk and woollen manufacture.

After traverſing the Sierra Morena it is no ſmall relief to enter the extenſive and fertile plain of Seville, which leads to that capital city, and makes ſome amends to the traveller for the ſcene of deſolation he has paſſed. You paſs through a beautiful country for three days, till you come to Antequera, ſituated on a hill at a league diſtance from a high mountain conſiſting of an entire block of fleſh-coloured marble, which muſt be croſſed on horſeback, to go to Malaga; ſeveral ſprings which iſſue from it form themſelves into a rivulet, whoſe banks are lined with perriwinkle, bulbous iris and the ſallow leaved hare's ear: the rocks are moſtly covered with the *lichen* called *orchilla* by the Spaniards, but as the ſort from the Canaries is preferred both in England and France, the gathering of it is totally neglected in Spain. That ſort which has little white ſpecks upon it like warts is thought to be the beſt; it grows on the higheſt rocks on the ſea coaſt, and fixes its roots in the cavities of the rock. Its common length is from one to three inches, and makes a conſiderable part of the commerce of the Canaries, where it is gathered at all times of the year; ſome goes to the Mediterranean markets, but the largeſt quantity for England, where they have a particular method of

of preparing it with human urine and other ingredients, ſo as to make it of great uſe in dying fine purples and bloſſom colours.*

The hills are covered with vineyards, and as you deſcend into the low lands, the eye is enraptured with the moſt beautiful objects; the dreary month of January in a northern climate is here a ſcene of delight, the fields are full of perriwinkle, myrtle, oleander, and lavender, with many other flowers in full blow, at that early ſeaſon, and this enchanting proſpect continues to Malaga, an antient and celebrated city, taken from the Moors, in 1487, by Ferdinand and Iſabel, after a moſt vigorous defence, and having been 772 years in their poſſeſſion.

* The name of *orchilla* was perhaps given it from the iſland of Orchilla, one of the Leeward iſlands, near the coaſt of Terra Firma, in America, where probably it was firſt diſcovered.

The ſort uſed by the dyers is the *Lichen Calcarius* of Linnæus, being ſo peculiar to limeſtone rocks that wherever that ſtone occurs among others, it may be diſtinguiſhed at the firſt view by this plant growing upon it. When dried, powdered and ſteeped in urine, it is uſed to dye ſcarlet by the Welch and the inhabitants of the Orkneys. The watry kind is the *lichen pertuſus* of Linnæus. Another ſort called *tartareus* by that great writer, is common in Derbyſhire, and gathered by peaſants who ſell it for a penny a pound to the dyers, who uſe it for purples. It is ſo plentiful that they can collect twenty or thirty pound a day. See Dr. Withering's botanical arrangement, &c.

on. A city not leſs remarkable for its opulence and extenſive commerce, than for the luxuriance of its ſoil, yielding in great abundance the moſt delicious fruits; whilſt its rugged mountains afford thoſe luſcious grapes which give ſuch reputation to the Malaga wine, known in England by the emphatical name of *Mountain*. Theſe valuable mountains have moreover a peculiar advantage, that the drought which is ſo prejudicial to corn, contributes principally to the goodneſs and flavour of the grape, as the ſurrounding miſts afford every neceſſary refreſhment, and are more ſerviceable than rain, which would rather injure the roots, by waſhing away that light coat of ſoil with which they are ſo ſparingly provided.

But before I leave Malaga I cannot omit ſpeaking of thoſe excellent and remarkable potatoes peculiar to that diſtrict, and in ſo great eſteem in other parts of Spain; they are ſweet and luſcious, of an oblong form and of a bright yellow colour like gold, and when roaſted eat extremely well with wine and ſugar; they are equally an American production though different from the common potatoe which is only known of late years at Madrid, and not in any other part of the kingdom, except Galicia where they are common as having been firſt brought there by the Spaniards, and from thence conveyed originally to Ireland.

About

About three miles to the weſtward of Malaga, there are gardens about a hundred paces from the ſea, and on a level with it, incloſed with the Indian fig or prickly pear, and with the aloe, whoſe ſharp pointed leaves ſerve as an excellent fence againſt cattle; ſeveral plants grow under their ſhade, particularly two ſorts of mallows, ſpurge, geranium, marſh marigold, borrage, aſphodel with onion leaves, baſtard dittany, ſorrel, clary, goldylocks, gooſegraſs, avens, nightſhade, ſhepherds purſe, fumitory, and white aſparagus; many of theſe even grow in the burning ſands on the ſea ſhore, and are in flower in January, alſo a great deal of celandine the ſame as in the interior parts of Spain.

Further on to the weſtward about two leagues from Malaga, there is a cavern where the water forms enormous pieces of calcareous ſpar,* which takes a beautiful poliſh, and much of it has been uſed in the royal palace of Madrid; ſome pieces are of a white ground, with veins of different colours, but in general the ground is grey, with a pleaſing clare obſcur happily ramified with white,

* Mr. Bowles's editor, page 121, very improperly calls this ſpar by the name of *Alabaſtro calizo*, "limy alabaſter;" as there is no ſuch thing in nature: it muſt either be a marble, or an alabaſter, and cannot partake of the properties of both, but from the mode of its formation it appears to be a ſpar.

at other times a dark grey interſperſed with veins of a brilliant white. This cave lies immediately under a conſiderable bed of lime rock, in a plain about a hundred paces from the ſea, and half that diſtance from a chain of limy hills, the decompoſition of which produces the ſpar above mentioned.

LETTER XII.

Deſcribing the country between Malaga and Cape de Gat.

THE firſt remarkable place to the eaſtward of Malaga is the town of Velez Malaga, near which the captive in Don Quixote is ſuppoſed to have landed from Barbary, with the beautiful Zorayda. A few leagues further is the little port of Herradura, where a fleet of gallies was loſt in 1562 under the command of general Don John de Mendoza who had ſailed from Malaga with twenty-four gallies, having 3500 ſoldiers on board, and finding the wind contrary, put into the Herradura, where he came to an anchor, but it blew ſo hard that twenty-three of the gallies were driven aſhore and loſt, and all the crews drowned.* This port is not laid

* Vida de Felipe IId. por Luis de Cabrera. Madrid, 1619. Alſo Guerra de Granada por Hurtado de Mendoza.

laid down on Lopez's map of Spain, but may be ſeen on the French chart of the Mediterranean, dedicated to the duke of Choiſeuil in 1764, by Joſeph Roux at Marſeilles, hydrographer to the king, and is an exact copy from Michelot, who was pilot of the gallies to Lewis the XIVth.

Further on, Motril is another little ſea port, and on the road to it, one may ſee ſamphire, orache, dock, thornapple, and cardomindum growing in the ſands on the ſea ſhore, with the Indian fig ſhooting out amidſt the rocks daſhed by the waves of the ſea. In different parts of this coaſt almoſt as far weſtwardly as Gibraltar there are above twelve ſugar mills called *Ingenios*. In Motril only there are four of them, which coſt at leaſt eight thouſand piſtoles each, ſugar having been made there time immemorial as perfect according to the opinion of good judges as any imported from the Weſt Indies, which is not ſo extraordinary when we conſider that the firſt ſlips of the cane were ſent from hence to the Canary iſlands, from whence Nicholas de Ovando, governor of Hiſpaniola, introduced them in 1506 into his government, where they thrived ſurpriſingly: but in Spain their culti-

Valencia, 1776. This event is hinted at in Don Quixote, where Sancho ſpeaks of Don Alonſo Maranon, Knt. of St. Jago, who loſt his life there. Vol. 3. page 412. Madrid, 1771.

vation is diſregarded, though the ſoil of the meridional provinces, the temperature of the air, and the glowing heat of the ſun are well adapted for the cane and many other productions of South America, which might be brought to perfection, were induſtry and encouragement in any proportion to the advantages of nature. With reſpect to ſugar it has been neglected through political motives, and the canes have been rooted up to make way for the vine: even the pine apple, which was firſt introduced from the Spaniſh ſettlements, was unknown in the royal gardens of their monarchs, till within theſe few years, that Boutelou, the king's under gardener, raiſed them at Aranjuez.

From Motril to Almeria you range along the mountains, many of which are of marble to the very ſummit, the ſtrand is level and ſandy, with very little earth, except near Almeria, which antient city was conquered from the Moors in 1147 by Alfonſo, ſtiled the emperor, aſſiſted by Garcias king of Navarre, Raymond count of Barcelona, and a fleet of Genoeſe; theſe laſt taking for their ſhare of plunder that beautiful veſſel, ſuppoſed to be an emerald, which they ſtill ſo carefully preſerve in their treaſury. They make ſalt-petre of the firſt boiling at Almeria, which is ſent to Granada to undergo a ſecond proceſs, without the aſſiſtance of fixed alkali, nor does the earth from which is collected contain any gypſum.

About half way towards Cape de Gat there is a large plain ſo full of garnets that a ſhip might be loaded with them; they are likewiſe to be found in a gully formed by the waves at the foot of a hill in that neighbourhood. The ſea ſometimes throws up worms hereabouts four or five inches long, and one broad near the belly, with circular loins and the body divided into ringlets, which emit a purple liquor flowing from every part when cut into pieces; of this ſpecies there are three ſorts, viz. the common *murex* which generally remains at the bottom of the ſea, the *nautilus* which by help of a fin ſails like a ſhip, and the worm without any ſhell thrown up by the ſea on this coaſt.*

The famous mountain of Filabres is about three leagues from Almeria, but it takes ten hours in going to it, the road is ſo turned by the many hills to be paſſed before one reaches it. This amazing and ſtupendous mountain is a ſolid block of white marble about a league in circuit, and two thouſand feet high, without the leaſt mixture of any other ſtone or earth, the marble appearing in many places where neither the wind, rain, or any of thoſe cauſes which deſtroy the hardeſt rocks, have yet made the leaſt impreſſion. On the ſide towards the village of Machael, lying at the foot of this mountain, a great part of the kingdom of Granada

* Don Guillermo Bowles. P. 146.

nada is diſcovered, which is mountainous, and reſembles the waves of the ſea in a ſtorm. On the other ſide the mountain is cut almoſt perpendicularly, and from its prodigious elevation affords a moſt awful proſpect, with the city of Gandia, which though at a diſtance, if conſidered with a bird's eye view, ſeems only half a league off. The Sierra de Gador is another immenſe maſs of marble, of which they make excellent lime. It diſſolves intirely with acids, without leaving the leaſt reſidue of clay or other matter, whereas the ſtone in other parts of Spain, particularly in Valencia, has a mixture of clay or ſand, of theſe we are to underſtand the Spaniſh proverb, with reſpect to ore, which is literally true in that kingdom, *Donde hai yeſo y cal, no hai mineral*; viz.

"Where of gypſe and lime there's ſtore,
"Don't expect to meet with ore."

Notwithſtanding the goodneſs of the marble of Gador, there is a great difference between the ſolidity of the old houſes in the village, and the modern ones, the former being much more durable, owing to the builders having uſed the ſand of the river Rambla, while the preſent generation, either from ſupineneſs, or ignorance, make uſe of ſea ſand, which from its ſaline nature attracts moiſture, and diſſolves, defeating the union neceſſary to be ſupported with the lime, which is not the caſe with freſh water ſand.

Amongſt

Amongſt other natural products of this country, the *Eſparto*, or matweed,* grows in great plenty, and deſerves particular attention; they not only make cordage with it for boats, but alſo mats for floors, ſackcloth, baſkets for raiſins, and above forty other articles in domeſtic œconomy. They even ſpin it like flax, which is made into linen, for which ſecret the inventor has been amply rewarded by his preſent majeſty, and a large ſum advanced him to ſet up his manufactory.

Cape de Gat is a huge promontory, conſiſting of an enormous rock, of a ſingular nature, different from any other appearance in Spain, eight leagues in circuit and five broad; the firſt object that ſtrikes the eye is a rock two hundred feet high, about fifty paces from the ſea, all cryſtalized in large ſtones of the ſize of a man's leg, with four or five plates chaſed one within another, of a cinereous colour, from eight to fourteen inches long, with a large grain that will take a good poliſh. Precious ſtones are ſaid to be found in the mountain of Bujo, in a cavern with an entrance about fifteen paces wide and twenty feet high, where the agitation of the waves is very great in bad weather; Mr. Bowles went in there but could diſcover nothing of conſequence. On the outſide a large white patch ſerves as a land mark to mariners, and from thence

* Stipa tenaciſſima. Linn.

thence called *Vela Blanca*. This is what is properly called Cape de Gat. Near the *Torre de las Guardas* there is a bed of jaſper of a white ground veined with red, and further on near the *Torre de Neſte*, a low rock is ſeen almoſt covered with a ſtratum of white cornelian. They gather a black ſand not far from the *Torre de San Joſeph*, which proceeds from the demolition of the rock, added to the conſtant percuſſion of the waves, and is ſold to throw over writing. They might find another ſort of ſand very near this place, leſs angular, which would anſwer for hour glaſſes, but they ſtill import it from Germany for this purpoſe.

In the centre of this promontory there are four hills near to each other, called the Sacriſtan, the Two Fryars, the Captain, and the White Mountain, but nothing remarkable is to be obſerved from their outward appearance.* The other ſide of the promontory, after paſſing theſe four hills, is called *El Puerto de la plata*, where the Moorish Corſairs lie lurking for Spaniſh veſſels to intercept them, and carry their crews into dire captivity. There

* Mr. Bowles ſays that Cape de Gat is the moſt meridional point of Spain, as may be obſerved by looking on the map, but ſuch an inſpection will convince us of the contrary, Europa Point at Gibraltar is more ſo, and often ſaid to be the moſt ſouthern point: but perhaps the *Punta de Carnero*, on the Algeziras ſide of the Bay is yet further ſouthward.

There is a rock near this *Puerto*, which extends towards the ſea, and called *El monte de las guardas*, where they find amethyſts, but ſtill more abundantly in a ſtratum of quartz of very difficult acceſs, being in a precipice twenty feet high. The true amethyſt reſembles a pyramid reverſed, while the rock cryſtal has ſix faces, and is larger at bottom than at top. But there is no probability of further reſearches for precious ſtones, or even for marble, as the exportation of this latter has been lately prohibited, by which a total ſtop has been put to the labour and induſtry of the inhabitants in that valuable branch. Were we to believe the boaſted accounts of the green jaſper found in a gully called *El barranco de San Juan*, in that part of the *Sierra Nevada* through which the river Genil paſſes to Granada, it is an univerſal remedy for all manner of complaints, and has ſingular effects if wore over the ſtomach, or applied to any part of the body where its efficacy is required. There are two ſorts of it, ſome having black veins and very hard, others with white veins, leſs ſo, but reputed equally efficacious.*

LETTER

* All its ſuppoſed virtues are ſet forth in a paper printed at Granada, without any date, entitled, "Maraviloſas virtudes de la Piedra Jaſpe verde ſacadas de muchos autores y confirmadas con muchas experiencias." It is not only uſed in the applications abovementioned, but pulverized, and when mixed with milk cures old wounds, the bites of ſerpents,

LETTER XIII.

Excurſion from the city of Granada to Cordova and Anduxar, in Andaluſia.

IN going from Granada to Andaluſia, the firſt ſtage is at Loxa, a journey of ten hours, through that beautiful plain called *La Vega de Granada*, and then aſcending a mountain, through another cultivated vale, with wheat, flax, hemp, and pulſe. Loxa is a middling town, pleaſantly ſituated on a high hill of conglutinated ſtone, which forms a kind of *brechia* or pudding-ſtone, in the centre of olive grounds having plenty of fruit, notwithſtanding its elevated, cold and dry ſituation.

From

pents, the piles, and is good for the ſight; but what is beſt of all, an excellent remedy againſt enchantments and witchcraft! John Fragoſo, in his *Cirugia univerſal*, ſpeaks of it in his index of ſimple remedies under the word *jaſpe* on the authority of St. Epiphanius. Morales alſo in his his "hiſtoria medecinal de la que ſe trahe de Indias," fol. 18; as alſo Galen, lib. 9, de facultatibus ſimplicium. Pliny, lib. 36, cap. 7, and lib. 37, cap. 9. Diſcorides, lib. 5, c. 117, and his commentator *Laguna*. According to the paper abovementioned, it has been in great demand ſince the year 1772.

From Loxa to the weſtward, the country is fertile, producing wheat and barley, in a limy ſoil well furniſhed with oak. The ſoil of theſe hills ſeems to proceed from the decompoſition of former rocks, many of which appear in broken lumps, intermixed with the arable land. Alameda is the firſt town in the kingdom of Seville: ſwallows make their appearance there in February, a few corn fields are ſeen in the low lands, but in general the weſtern boundaries of Granada are made up of ſteep rocks and craggy mountains. The *Solano* winds prevail much here, and do a great deal of miſchief, deſtroying the harveſt if they blow early in the ſeaſon. The country people are fond of tobacco, and though they have near them thoſe excellent wines of Malaga and Xerez, they ſeldom or ever drink them, preferring diſtilled liquors, * without any viſible prejudice, for the men are robuſt, and the women have good features, with lively ſparkling eyes full of expreſſion and fire. The country is extremely pleaſant to Herrera, with a white and red earth which is remarkably fertile, diveſted of any looſe ſtone, pebble, or flint, ſo common in other parts of the kingdom. This rich ſoil is a perfect marl, and under the olive tree yields plentiful crops of wheat and barley. Eſtepa, about a league from Herrera,

* Called in Spain *roſoli* and *miſtela*.

Herrera, ſtands in a picturesque manner, on the top of a hill ſurrounded with olive trees. The olive of Eſtepa is ſmall, but delicious, and gives an oil as clear and delicate as that of Valencia. The Seville olive, though often as large as a dove's egg, does not yield near ſo good oil, for which reaſon they are more frequently pickled. Even ſo far back as the days of Cicero they were in high eſtimation, for in writing to his friend in Andaluſia he compliments him on being intendant of ſo fertile a province, and reminds him to ſend him ſome Seville olives to Rome. They are very careleſs notwithſtanding in making their oil, leaving the fruit a long time collected in heaps, ſo that it rots before it is ground, part of the oil turns into mucilage, and acquires a rank and diſagreeable flavour, and as there are few mills in proportion to the quantity of fruit, each perſon is obliged to wait for his turn ſometimes for months, from whence in this warm climate a fermentation enſues, which of courſe occaſions bad oil. Others deceive themſelves through a principle of avarice, for though the olive yields more juice from having lain by for ſome time, it is at the expenſe of its quality, ſuch thin fermented matter hardly deſerving the name of oil, for which reaſon, and from their little care in putting it into proper veſſels, and carrying it about the country in ſkins, the oil in general is wretchedly bad at Madrid.

The

The olives are gathered from the middle of October to the middle of November. If a good year they ſell from 20 to 24 reals the arroba (about 5*s.* 4*d.* ſterling) but in years of ſcarcity will riſe to 36 or 40 reals. A *fanega* of olives will yield an arroba of oil. In the ſouth of France they are not gathered till they are perfectly ripe, and have acquired a reddiſh hue inclining to black; if this period paſſes, they wrinkle, moulder, and rot. Thoſe that are green give a bitter taſte to the oil, and they carefully ſeparate ſuch as are worm-eaten, which would vitiate the flavour of the ſound ones, they grind them as in Spain, then the ſubſtance is laid under the preſs; the firſt juice that runs out is called virgin oil, and is the moſt delicate for the table, its goodneſs ariſing from the freſhneſs of the fruit. The ſecond ſort is obtained by pouring boiling water on the ſubſtance remaining in the preſs; but this oil is like that of Spain, acrimonious, and ſubject to corruption. In general all oil obtained by fire or hot water, is of a bad quality; much will alſo depend upon its being put into proper veſſels, clarifying it with judgment, and placing it in commodious cellars with a proper medium of heat and cold, both extremes being equally prejudicial. In the year 1769, Mr. Sieuve of Marſeilles, preſented a memorial to the academy of ſciences, deſcribing the beſt method to make oil, having invented amongſt other improvements,

ments, an inſtrument to ſeparate the fruit from the ſtone, by which the olive is freed from thoſe viſcous, fetid, and ſulphureous particles which are found in the ſtone, and alterate the juice of the fruit; but theſe hints ſeem to have little weight with the Spaniards, who continue the old method, implicitly following the cuſtoms of their forefathers.

It is five hours journey from Herrera to Ecija, agreeably ſituated, but one of the hotteſt towns in Spain. The horſes of Ecija are reckoned the beſt in Andaluſia, and remarkable for the goodneſs of their hoofs, owing to the dryneſs of the ground, while at Seville, and in the flat country on the banks of the Guadalquivir, they are ſpungy, and liable to crack in hot weather; but in point of ſhape, the beautiful horſe of Cordova is the moſt perfect, though of late their ſtuds are greatly neglected. *

Nothing

* There is a curious Arabic manuſcript in the Eſcurial, marked DCCCXCVII. on horſes and horſemanſhip, written by a Mooriſh general, and dedicated to Abdalla king of Cordova IIId, of the race of Bennaſſaret, who reigned A. D. 1301, which if ever made public, might perhaps illuſtrate what we have already received from the illuſtrious names of Newcaſtle and Pembroke. The title as given by Caſiri in his catalogue of Arabic manuſcripts in the eſcurial is as follows. "Theatrum equeſtri Abu Mahommed Abdala Latkamita Cordubenſi, viro genere dignitate

Nothing can be more delightful than the face of the country from Ecija to Cordova, a ſpace of nine leagues, yet without a ſingle village, or even a ſpring; for which reaſon they muſt have a great deal of rain to have any crop, but when they are bleſſed with plentiful ſhowers their harveſt is very great. The city of Cordova is ſeated on the banks of the Guadalquivir, about a league from the Sierra Morena, and has ever been famous for the magnificence and ſplendor of its nobles. Even the Jews in former times are ſaid to have vied with the others in pomp and parade. § Its cathedral is famous for its antiquity and ſtructure, with numerous pillars of different marble, which ſeem to have been taken from old Roman ſtructures.

dignitate ac laude bellica præclaro. Is naturas equorum, proprietates, colores, formas, adnotatas etiam multis eorum nominibus erudite atque eleganter hoc opere perſecutas librum ſuum Regi Abdalla Mahommed Ben Naſſor Almanzor dedicavit. Accedit in extremo codice equitandi diſciplinæ ſynopſis."

§ If any credit is to be given to David Gânz in his edition of Vorſtius, quoted by Sarmiento. Quotidietune exibant Korduba in Hiſpania Septingenti viri Iſraelitici qui vehebantur ſeptingentis curribus, omnes veſtiti indumento regio et redimiti tiaris Juxta legem magnatum Imaelitarum.— Memorias para la hiſtoria de la poeſia y poetas Eſpanoles. Madrid. 1775.

tures. The country from Cordova to Anduxar is extremely well cultivated, and beautifully varied with corn, olive and vines; as the ground is in general of a hard nature, and does not give way, the rains have no other effect than gently waſhing away a ſmall part of its ſurface, for which reaſon thoſe deep gullies, ſo common in Murcia and Valencia, are not ſeen here, where the ſoil is compoſed of different kinds of earth, alternately with rock, and eaſily carried off by the waters. This accounts for their having ſuch plentiful crops in Andaluſia after heavy rains, with ſuch deep ſloughs; but after a drought they have ſcarce any harveſt, and travellers are ſmothered with duſt. They are famous about Anduxar for making thoſe little pitchers of a white argillaceous earth that preſerve water ſo cool in ſummer. In other parts of Andaluſia they have earth of the ſame quality of a red colour, with which they make elegant drinking bowls that keep the water equally cool as the others, being light, thin, porous, and having the ſurface always damp: but they are not ſo fine and delicate as thoſe earthen veſſels from the Weſt-Indies called *bucaros*, nor made with ſuch neatneſs and art. The Spaniſh ladies are ſo fond of them, that not content with putting broken pieces thereof into their boxes to give a flavour to their ſnuff, they will frequently eat them with ſingular pleaſure. Beſides what is uſed

in

in this manner, they have boxes reſerved for it ſolely, and their attachment to *bucaro* is ſo great, that the old ladies pile it up in cabinets like valuable china; in theſe jarrs and baſons they occaſionally put water, which diffuſes a freſh earthy ſmell, which they are very fond of in their apartments.

LETTER XIV.

Obſervations made in a progreſs from Cadiz to Carthagena.

THE city of Cadiz is built on a peninſula upon rocks ſtretching out into the ſea, compoſed of a great variety of matter, ſuch as marble, ſpar, pebble and ſhells incorporated in the ſand, and combined together by a glutinous ſubſtance in the ſea, which ſeems powerful in this place, as may be obſerved by the rubbiſh thrown into it, inſomuch that bricks, ſtone, ſand, ſhells, &c. after a certain time become conſolidated, and form one ſingle maſs.

In 1440, John king of Caſtile gave this city to Don Pedro Ponze de Leon, with the title of Count thereof; his grandſon Don Rodrigo was afterwards made Duke of Cadiz, in 1484, by Ferdinand

and Iſabel, but thinking it a place of too much conſequence after the diſcovery of America, they took it from him again, and made him Duke of Arcos. In queen Elizabeth's reign, it was taken by ſtorm by the Engliſh forces under the Earl of Eſſex with a trifling loſs, Sir John Wingfield, quarter-maſter general of the army, being the only Engliſhman of note killed in the expedition.* In old

* Sir John Wingfield was grandſon of Sir Anthony Wingfield, knight of the garter, vice-chamberlain of the houſhold, and captain of the guard to king Henry VIII. immediate anceſtor to Sir Mervin Wingfield, Bart. who dying without iſſue male, the title became extinct, and his only daughter, Mary, married Francis Dillon, Eſq; late of Proudſton in the kingdom of Ireland, and was mother to John Talbot Dillon, who dedicates this note to her memory.

Sir Richard Wingfield of Kimbolton brother to Sir Anthony Wingfield above-mentioned, was appointed marſhal of the town and marſhes of Calais, by Henry VIII. 14th November 1511. The next year he was one of the embaſſadors to treat with the pope and emperor. In 1514 he was made a banneret at the ſiege of Tournay, and joined with Sir Gilbert Talbot in the deputyſhip of Calais, was ſent into Flanders embaſſador to Charles prince of Spain, and appointed with the duke of Suffolk, to receive the queen dowager of France, and conduct her into England in 1521; he was one of cardinal Wolſey's retinue to meet the emperor in Flanders, was chancellor of the dutchy of Lancaſter, and on the 23d of April 1522, having had the honour to be elected knight of the garter in the ſame ſcrutiny with Ferdinand afterwards emperor, he was inſtalled the 11th of May at

old Spaniſh chronicles it is called *Calis*, from whence our Engliſh mariners generally call it Cales.

The *Solano* wind is ſtill more prejudicial here than in Seville, and when it has blown for eight or ten days, introduces ſuch an acrimony in the blood, and cauſes ſuch a tenſion of the fibres, as to have the moſt alarming effects on the fair ſex, with every unpleaſing ſymptom, like the *Scirocco* in Italy.

In the capuein's garden there is a dragon tree, ſuppoſed to be the only one in the kingdom, though it grows naturally in the Cape de Verd

 iſlands,

at Windſor. That year, with Sir William Sanders, knight of the garter; he led the rear of the Engliſh army ſent into France; attended on the emperor into Spain, at his return from whence he was preſent at the burning of Morlaix. In 1525 he was ſent embaſſador into Spain, with Cuthbert biſhop of London, and died at Toledo 22d July, where he was buried with great ſolemnity in the church of the friars obſervants of St. John, by the directions of Navera king of arms of Spain, aſſiſted by Chriſtopher Barker Richmond herald. He married to his firſt wife Catherine daughter of Richard Widville Earl Rivers, widow firſt of Henry Stafford Duke of Buckingham, and after of Jaſper de Hatfield, Duke of Bedford, by which marriage Sir Richard became great uncle to king Henry VIIIth.

Sir Richard Wingfield, another deſcendant of this family, was conſtituted mareſchal of Ireland, by queen Elizabeth, and one of the lords juſtices by king James the Iſt, who alſo on the 1ſt of Feb. 1618, created him viſcount Powerſcourt of that kingdom.

iſlands, as well as at the iſland of Madeira.* Modern writers have fully deſcribed the extenſive commerce, affluence, and hoſpitality of the citizens of Cadiz: they are badly ſupplied with water, and their fleſh market is indifferent, but the bay affords them a variety of excellent fiſh, particularly dories, called here St. Peter's fiſh,† ſoals, and red mullets, with many other ſorts, of an excellent flavour.‡

Port St. Mary is a large and handſome city; on the north ſide of the bay, from whence it is a journey

* Profeſſor Vandelli, of Liſbon, principal botaniſt to the king of Portugal has publiſhed a treatiſe on the dragon tree. See "Vandelli diſſert. de arbore Draconis Oliſſp. 1768."

† So called from a legendary tale of St. Peter, who when he found money in the fiſh's mouth to pay tribute, left the marks of his fingers upon the fiſh.

‡ Saurez Salazar, a prebendary of Cadiz, has publiſhed the antiquities of this city, and has given a deſign of the famous ſtatue of Alexander the Great, which he ſaw in his time, and ſuppoſes may be the ſame that ſtood in the temple of Hercules, viſited by Cæſar, which drew tears from that illuſtrious warrior; but if, ſays our author, Cæſar was to behold it again, he would weep once more to ſee it in ſo bad a condition. This reverend prelate the more clearly to evince the ſpirit and vivacity of the women of Cadiz, has collected, with the gravity of a ſchoolman, the moſt obſcene lines of Martial, Juvenal and Catullus, to illuſtrate their libidinous conduct, and this he dedicates to cardinal Don Antonio Zapata. "Grandezas y antiguedades de la Iſla y Ciudad de Cadiz por Juan Bantiſta Salazar Racionero en la Santa Igleſia de Cadiz." En Cadiz, 1610.

ney of three leagues to the city of Xerez, remarkable for its excellent wine ſo well known by the name of *Sherry*. The beſt and richeſt ſort is called *Pagarette*, from the Spaniſh word *Pago*, a diſtrict, and particularly applied to this vintage. In one *aranzado* (an acre of vineyard) they plant 1800 vines at regular diſtances. It is reckoned a good year if it gives three butts per acre, middling if it gives two, bad if it gives but one, but ſome years it yields four or five.*

Medina Sidonia is ſix leagues from Xerez, then the city of Arcos, ſeated on a cragged rock, at the foot of which runs the river Guadalete, on whoſe banks the unfortunate Roderic the laſt Gothic king of Spain loſt his life and dominions; a route of ten hours through a ſtony country leads to the village of Algodonales lying under a high mountain, pierced through from Eaſt to Weſt. The people here have a tradition that this place was built by the Romans who had made this perforation in ſearch of a mine.

The

* Names of grapes : - - *Pedro ximenes*, *palomino*, *cauocazo*, *alvillo*, *bejarego*, *mantudo*, *penuno*, *muſcadel* large and ſmall, *calona* for eating, *feral* and *molinar* both for eating and wine, *beba*, to eat, almunecar for wine.

The firſt year the vine is called *ſarmiento*, a ſhoot; ſecond, *grenuela*, little fruit and not good; third, *deſcavezados*, pruned; fourth, *virote*, much fruit and not good wine; fifth, *majuela*, compleat vine makes good wine. The vines continue ten years in full force, and laſt a hundred years with proper care.

The city of Ronda is ſix leagues from Algodonales, on a very high ſituation, it being a continual aſcent from Xerez, which continues as far as Gibraltar: the country about Ronda is remarkably fertile and ſupplies Cadiz with all kinds of fruit and vegetables, the ſoil is of a reddiſh colour with pebble and reſiſts the heat of the fire, for which reaſon it is much uſed in furnaces for fuſing iron. Amongſt other curioſities with which the country of Ronda abounds, that little animal called the gennet is one of the moſt extraordinary, and not to be found in any other part of Europe except Turkey. It is ſmaller than the civet, has a long body, ſhort legs, a ſharp ſnout, and a ſlender head; under its tail there is a long bag which emits a perfume. Its fur is ſoft and gloſſy, of an aſh colour marked with black ſpots, which unite upon the back and form ſtripes which run longitudinally from the neck backward, with a long tail diverſified with ringlets of black and white: the fur was formerly in eſteem, but of late has been counterfeited by tinging grey rabbet ſkins with black ſpots, and is now out of faſhion.* The diſtrict of Ronda alſo

* We read in the hiſtory of France, that Charles Martel having obtained a compleat victory over the Saracens, at the battle of Tours, in 762, found ſo many of their helmets, ornamented with the ſkins of gennets, that he inſtituted the order of knighthood of the Gennet, in memory of that action.

alſo furniſhes the fierce bull, the ravenous wolf and other obnoxious animals; its rocks ſerve as a retreat for the eagle, the oſprey and kite; yet notwithſtanding ſuch numerous enemies its ſoil makes ample amends by its unbounded fertility. †

About three leagues from Ronda to the ſouth eaſt, and four from the little ports of Eſtepona and Marvella, an attempt has been made ſome years ago to erect a manufacture of tin-plates by Don Miguel de Topete, marquis of Pilares, aſſiſted by Benito Berbrungen, a fugitive Saxon, who brought the ſecret from Germany. Three hundred thouſand dollars (£50,000 ſterling) have been

on. The knights wore the figure of that animal pendant to a golden chain about the neck. This order ſupported itſelf till the reign of St. Lewis, when it fell into diſrepute. Mr. de Buffon appears to have been miſinformed in ſaying that the gennet could only live in low and marſhy ſpots, when the mountains of Ronda abound with them. See "Journey from Gibraltar to Malaga, by Francis Carter, Eſq;" London, 1777.

† See Natural hiſtory of Ronda in Mr. Carter's journey, who ſays that that the diſtrict of Ronda is ſo fertile that the druggiſts ſhops are ſupplied with medicinal herbs from thence both in Spain and the Indies. An account of theſe plants has been publiſhed in Spain by Don Macario Farinas, who died in 1660, under the title of "Virtudes nuevamente deſcubiertas de las hierbas medicinales de la Sierra de Ronda.

been laid out in buildings and other acceſſories relating to this manufacture to very little purpoſe. On the road to the manufactory, there are iron mines where the ore is found in little pieces like comfits, ſimilar to that of Befort in France. Four leagues from hence to the South Eaſt, nearer the ſea, there is a famous mine of black lead, the true *molibdena*, being a perfect mine, not divided in lumps in the ſand-ſtone, like the other mentioned before, yet even this is totally neglected. A few years ago, a foreign conſul had the king's leave to extract two hundred and fifty quintals per annum, but it is preſumed he got four times that quantity. Near the town of Ximena they are building a cannon foundery. They get the ore in *Sierra* at about two leagues diſtance, and it is ſaid to be very good: they alſo find loadſtones. The revenues collected at Marvella, Eſtepona, Manilva, &c. are applied to the expenſes at Ximena, which is five or ſix leagues from the ſea with very bad roads.

The *Sierra Vermeja* is a range of hills which run weſtwardly towards Malaga, and afford a ſingular curioſity, for though they run parallel, and ſo cloſe that their baſes join, yet one is red and the other is white; ſnow will not remain on the higheſt, while it conſtantly covers the other. The white hills produce the cork tree and *Encina* oak; the

the red has no oaks, but is covered with firs. The white has iron ore in little lumps; the red has ſeveral ores but no iron. The waters of the white hill are martial and vitriolic; thoſe of the red ſulphurous, alkaline, and with a ſtrong ſmell like thoſe of Cotterets in France. Near this place is the laſt village on the Carthagena ſide; the Granada hills are covered with the golden ſaxifrage, which the Spaniards call *doradilla*, and hold in repute in calculous caſes.

The plains of Lorca abound with oleander, which on account of the bitterneſs of its leaves is named *amarga adelfa*, and ſerves as a conſtant compariſon in Spaniſh ſonnets and novels. Near Lorca there are two antient mines of lead and copper, and in the *Sierra* towards the ſea near Carthagena, the village of Almazarron is famous for its fine red earth without any mixture of ſand, and is a principal ingredient uſed in Spaniſh ſnuff, to give it that fine colour and ſoftneſs to the hand, and to fix its volatility. It is ſometimes called after the name of the village, but more commonly *almagre*, and is likewiſe uſed in the glaſs-houſe of St. Ildefonſo inſtead of *tripoli*, to give the laſt poliſh to glaſs, as others uſe *colcothar of vitriol*, the caput mortuum, or reſidue left at the bottom of the veſſel after the diſtillation of vitriol. Spain alſo furniſhes *colcothar nativa rubra*, which is a red martial earth loaded with vitriol, but this is a ſcarce article

article in commerce. The neighbourhood of Almazarron moreover affords another ſingularity, and that is the white ſtone called plume alum, or *pſeudo aſbeſtus*, which is a matter truly ſaline, taſting and diſſolving in water like alum, and cryſtalizing in form of feathers, from whence its name, being found thus in grottos, where aluminous minerals paſs. The other matter to which the name of plume alum has been given, is nothing elſe but a friable *amianthus*, or *aſbeſtus*. Near Almazarron the remains of a ſilver mine are to be ſeen, which in former times is reported to have yielded great quantities of ſilver. A plain of ſix leagues, with reddiſh ſoil, like the neighbouring hills, leads to Carthagena, and is ſo fertile in corn, in rainy ſeaſons, that it produces ſixty for one; but this ſeldom happens, as the country is frequently ſcorched up, and they ſuffer from droughts; however their plentiful harveſt of *barilla** makes them ample amends, requiring little water, and being in great demand in England, Ireland, and France, for making cryſtal glaſs, hard ſoap, and for bleaching. Beſides theſe advantages, the kingdoms of Granada and Murcia, yield together, annually, 700,000lb. weight of raw ſilk, which is now totally conſumed in the manufactures of Spain, which muſt have increaſed to an immenſe degree, as formerly the exportation of raw

* Salſola ſonda. Linn. Glaſs wort.

raw ſilk was very great; whereas, of late years, upon ſhort crops, they have ſometimes been under a neceſſity of importing it from Italy. The famous harbour of Carthagena has been lately deſcribed by an ingenious traveller. § They make cables in the arſenal of Carthagena with hemp from the kingdom of Aragon, the uſe of which was introduced under the direction of the late celebrated admiral Don Jorge Juan, and they imagine them to be equal in goodneſs to any imported from abroad. Amongſt the ſtone at the bottom of the harbour, the fiſhermen bring up the *Pholades*, which a few years ago were not known there, the people not ſuſpecting they could ſubſiſt in the centre of their rocks, without any viſible aperture to get in at; at preſent they are ſearched after as a delicate morſel, and are to be found in moſt places on the Mediterranean coaſt.

Being now in the kingdom of Murcia, I ſhould not forget the baths and waters of Archena, whoſe virtues are ſo extolled as to be thought an univerſal remedy for every diſorder, concerning which Don Franciſco Cerdan a phyſician of Villena, publiſhed a diſſertation in 1760. A profeſſor of poetry having found great benefit from the warm baths,

§ Travels through Spain in 1775 and 1776, by Edward Swinburne, Eſq. London 1779.

baths, has alſo ſung their praiſes in a poem.* Theſe baths were frequented by the Romans, as appears from an inſcription on a very hard ſtone, almoſt black, and roughly cut, found in the men's bath in 1757, which is now fixed as a reſting place at the door of a principal houſe near the river; the inſcription is as follows.

C. CORNELIVS CAPITO. L. HEIUS LABEO II. VIR AQVAS. EX D. D. REFICIENDAS CVRARVNT. IQ. P.

THAT IS

Caius Cornelius Capito, Lucius Heius Labeo Duumviri aquas ex Decreto Decurionum reficiendas curarunt iidemque poſuerunt.

LETTER

* See Thermæ Archenicæ, por Don Ignacio Ayala, profeſſor de poeſia en San Iſidto en Madrid. Impreſſo en Murcia en latin y Eſpanol, 8vo, 1757.

The other hot baths of Spain are Ledeſma in Caſtile, Trillo, Hardales in Andaluſia, Alhama in Granada, Villavieja, Buzot, Sacedon, Grena, Fortuna, Azaraque, Mula, and others of leſs note.

LETTER XV.

The face of the country deſcribed between Carthagena and Alicant.

IN going from Carthagena to Alicant, you croſs the rich veil of Murcia, covered with mulberry trees, and paſs through a delightful country to Orihuela and Elche,* remarkable for its numerous groves of palm trees, the branches of which are a lucrative article of trade. The fertility of this country, particularly round Orihuela, exceeds all deſcription, their harveſts of wheat are very great, and they are reckoned to have the beſt bread in Spain. At Orihuela they make thoſe curious ſnuff-boxes with the roots of the terebinthus, called *cornicabra* in Spaniſh, which are ſo much admired on account of their beautiful ſhades, repreſenting landſcapes, &c. they are chiefly uſeful for Spaniſh ſnuff, as they preſerve it moiſt and cool, and for this purpoſe are in great eſtimation at Rome. As a further proof of the great abundance and plenty

* The antiquities of Elche have been lately illuſtrated by Don Antonio Mayans, canon of Valencia, brother to Don Gregorio Mayans y Siſcar, the celebrated writer. See "Ilici hoi la villa de Elche illuſtrada con varios diſcurſos, por Don Juan Antonio Mayans y Siſcar." Valencia, 1771.

plenty at Orihuela, it is ſaid that the tythes of *Pimenton* and *Tomates*, "guinea pepper and love apple," paid to the biſhop of Orihuela, amount to £1600. ſterling per annum.

The caſtle of Alicant ſtands on a limy rock above a thouſand feet high, having ſhells half petrified on its ſummit. The plants of the vallies grow alſo on its top, the ſeeds of which were probably dropped by birds, or brought by the winds. The eaſtern ſide of the hill contains red wavy flint, with pieces of agate fixed in the rock, and on the weſt ſide there is plume alume in the crevices of the rock, and lower down beds of *tripoli*, which is uſed by the ſilverſmiths in theſe parts. Going from the city towards the north-weſt about half a league diſtance, the fields are full of thoſe ſtones called *numulariæ*, and by the people of the country *monedas de las bruxas*, "witches coin." Likewiſe *lenticulares*, ſome of which are as ſmall as a pin's head. This country alſo produces the *ſcinus molle*, or Peru pepper, whoſe fruit grows in bunches of a handſome roſe colour.*

The

* In Gerard's herbal mention is made of a tree called *molle* or balſam tree, "This tree, ſays a learned phyſician, Johan Fragoſas, grows in the king of Spain's garden at Madrid, which was the firſt he had ever ſeen; ſince which time Juan Ferdinando, ſecretary to the king, did ſhew unto the

The *huerta de Alicante* is a beautiful plantation, about one league long and two broad, full of vineyards, which they are ſometimes obliged to water; the grape nevertheleſs affords that excellent wine ſo well known, to which muſt be added an amazing quantity of mulberry trees, almond trees, fig, and *algarobas*, or carob trees, the *ceratonia edulis* of Linnæus, which requiring little moiſture, ſucceeds in dry ſoils, and thrives equally in every ſituation, whether on hills or in plains.*

The city of Alicant forms a creſcent, on the ſea ſide, and is well known for the luxuriancy of its environs,

the ſaid Fragoſas in his own garden, a tree ſo large and of ſuch beauty, that he was never ſatisfied with looking at it, and meditating on the virtues thereof." See Gerard's herbal, and Lobel's deſcription of it.

* The fruit grows in a hulk like a bean cod, incloſing four or five beans, and is given to cattle ſhell and all. It is ſweet and palatable, and often eaten by poor people: it is a tall ſightly tree, and in a manner peculiar to the kingdom of Valencia. The pods are green on the tree, but grow brown when dry. According to Miller, they are apt to looſen the belly, and cauſe gripings of the bowels. He ſays, theſe pods are directed by the college of phyſicians to enter ſome medicinal preparations, for which purpoſe they are often brought from abroad. The tree is preſerved as a curioſity in England among other exotics, as the leaves always continue green, and being different in ſhape from moſt other plants, afford an agreeable variety, intermixed with oranges, myrtles, &c. in the green-houſe.

environs, as well as its extenſive and lucrative commerce. That part of the ſhore neareſt the city forms a bed of limeſtone mixed with ſand, in which the triple-hinged oyſter ſhells are found, with *buccinæ*, *molæ*, *tellinæ*, and *urſini*, half petrified, the ſhells often preſerving part of their natural varniſh, and the oyſter ſhells their ſcales, by which the commencement of their petrifaction may be perceived. In that part of the beach next the ſea, the ſand is the ſame as in the neighbouring rocks, waſhed from the limy earth, which the water has diſſolved, leaving only the *pilla marina* formed by the fibres of the roots of the *alga*, or ſea moſs.

A chain of hills are diſcernable at Alicant, extending from Murcia, forming a ſemi-circle of two leagues extent from the city, and cloſe in with the ſea about four leagues from each other, ſhutting in a fine vale, and incloſing the part we have ſpoken of before, which it ſhelters from the north winds, and enables it to partake more effectually of every benign influence of the ſouth. The weſtern ſide is uneven, full of ſtone, and conſiſts of a white calcareous ſoil, whoſe ſurface is covered with large ſhells more perfectly petrified than thoſe on the ſea ſhore, particularly two ſorts of *urſini*, the large and ſmall, the former of the ſize of an orange, found ſtill larger in the interior parts of Valencia, of a diſtinct ſpecies, and ſo perfectly petrified as to receive

receive a poliſh like marble, being different from thoſe generally ſeen in cabinets of natural hiſtory. The oyſter ſhells between Murcia and Mula are alſo diſtinct from thoſe of Alicant, having only one hinge, are about eight inches long and five broad; which opens a field of ſpeculation for naturaliſts, with reſpect to theſe various petrifactions and their period of antiquity.

Two leagues to the ſouth weſt of Alicant, there is an inſulated calcareous mountain, at the eaſtern foot of which they find ſmall cryſtals, red, yellow and white, with two points like diamonds as regularly cut as if done by a lapidary. The red and yellow are hyacinths. A ſpring called *Fuente Caliente* iſſues from that ſide of the mountain, and waters the lands belonging to the houſe of the late admiral Don Jorge Juan,* ſo well known to the

 learned

* Don Jorge Juan died in 1773, and is buried in the church of St. Martin, in Madrid, where a monument is erected to his memory, with his buſt in profile, by Philip de Caſtro, and the following inſcription.

Ex D. D. Georgius Juan & Santacilia Noveldae apud Valentinos natus, melitenſis ordinis Eques, Bellicae claſſis agmini Praefectus, nobilis ſcholae nauticae cohortis Dux et Regii matritenſis ſeminarii moderator: Domito novae ſtructurae navibus mari, luſtrata Legatione ad Marochium Africa, peragrata ad telluris figuram aſſerendam America, literariis laboribus Europa ejuſque academiis, Hiſpana Divi Ferdinandi,

learned world, who was born at Novelda, in this neighbourhood.

On doubling the firſt point of land to the eaſtward of Alicant, the bay and harbour of St. Paul preſents itſelf, with a view of the antient caſtle of the duke of Arcos. Here the ſhips come to an anchor

nandi, Gallica, Anglica, et Boruſa illuſtratis, quam a Deo acceperat vitam, pietatem optimiſque moribus excultam, poſt annos LX. Deo reddidit Matriti Kal Jul. A. M. MDCCLXXIII. cariſſimo fratri Bernardus et Margarita moerentes annuente III. D. D. Joannae Zapata, Marchione S. Michaelis de Gros corpus hic condi et monumentum poni curarunt.

Don Jorge Juan publiſhed the following works.

Compendio dè la navegacion para el uſo de los Caballeros Guardias Marinas. Cadiz, 1757.

Examen maritimo Teorico Pratico; o Tratado de Mecanica aplicada a la Conſtruccion conocimiento y Manejo de los navios, &c. Madrid, 1771.

Relacion hiſtorica del a la Viage America meridional y obſervaciones aſtronomicas y Phyſicas en el reyno de Peru por Don Jorge Juan y Don Antonio de Ulloa, 5 tomos, 4to. Madrid, 1748. The hiſtorical part of this work was written by Don Antonio de Ulloa, now an admiral in the Spaniſh fleet, and has been tranſlated into Engliſh, of which there has been a third and improved edition. See "A voyage to South America, deſcribing at large the Spaniſh towns, provinces, &c. on that extenſive continent, undertaken by command of the king of Spain, by Don Geo. Juan and Don Ant. de Ulloa, F. R. S. &c. with copper plates, and a preface by Dr. Campbell, 2 vols. 8vo."

anchor and load ſalt from the *Mata*, a great lake by the ſea ſide, but without any viſible communication with it. The quantity of ſalt collected here is immenſe, and is the property of the king, coſting little more than the labour of heaping it, being in a manner produced naturally. The high bank which ſeparates the ſea from the *Mata* appears natural; the lake is bounded on the land ſide by mountains, and is formed by the torrents of rain water that guſh down in winter, which evaporating gradually by the heat of the ſun, added to the nature of the ſoil, become a maſs of ſalt, ſo plentiful that ſome years the exports have amounted to near one hundred thouſand tun weight, chiefly for Holland and the Baltic; conſiderable quantities alſo are in demand for curing of fiſh, particularly for Newfoundland and New England. The coſt is about eleven ſhillings ſterling per tun, on board; and the king, in order to encourage the export, lets the price always remain the ſame.* The ſoil and air in general, on the coaſts of Valencia, Murcia, and Granada, is impregnated to a very uncommon degree with ſalt, and conſiderable ſalt-petre

* The iſland of Ivica alſo produces immenſe quantities of ſalt with as little trouble and expenſe as that of the *Mata*, and they have a conſiderable exportation, much on the ſame footing, it being equally the property of the king. This is ſalt alſo ſold for home conſumption, at a price equal to about four ſhillings ſterling per cwt. Engliſh.

works are carried on in many ports, particularly at Murcia and Lorca, collected from the earth in the fields, the very duſt on the roads and in the ſtreets; from which, after extracting the quantity of ſalt-petre, the ſame dirt, thrown up in large heaps, ſerves again in four or five years, for the like purpoſe, and furniſhes a freſh ſupply. This circumſtance renders the ſoil ſo peculiarly favourable for the culture of *barrilla*. There are eight or ten different ſorts of plants in the plains of Alicant, whoſe aſhes ſerve for making glaſs and ſoap; but the *barrilla** is the principal and beſt ſort: the method of making it is well deſcribed in Miller's gardener's dictionary, and is much the ſame as is uſed in the North of England in burning kelp. An acre may give about a tun.

I cloſe this letter with the further obſervations made here by Don Guillermo Bowles, relating to a cinnabar mine, which I ſhall give in his own words, as they relate to particular reſearches of his own: "About two leagues from Alicant there is a mountain called *Alcoral*, compoſed of lime-ſtone. On digging in that part next the valley, I diſcovered

* The four principal plants for the purpoſes abovementioned are diſtinguiſhed by the names of *barrilla*, *gazul*, *ſoſa*, and *ſalicor*, and are difficult to be diſtinguiſhed except by good judges They have been fully deſcribed by Mr. Swinburne.

ed a bed of mineralized mercury with ſulphur and calcareous earth, of the ſhape and colour of cinnabar; however as this bed diſappeared at a hundred feet depth, I ſuſpended my purſuits. I found thirteen ounces of heavy ſand, of a beautiful red colour, in a crevice of rock; I eſſayed one ounce, and found it to contain more than eleven ounces of quickſilver per pound; it perfectly reſembles the ſea ſand in its hardneſs and angular form. The colour becomes livelier when pounded, which ſhews that every grain was poſſeſſed of ſulphur and mercurial vapour, in the ſame manner as the ſand is with iron at Cape de Gat.

On the top of this mountain, and not far from a bed of red gypſum, I found different marine bodies petrified, ſuch as *telenites* and pieces of *madrepores* mineralized with iron as well as other petrifactions: and about fifteen feet under ground I diſcovered pieces of mineralized amber, fixed in the rock, being of the ſame ſort as thoſe on which the late Don Joſeph Sunal, the king's phyſician, publiſhed a treatiſe. There is of this amber in Aſturias, near Oviedo, but not ſo beautiful as the ſpecimen ſhewn to me by that phyſician. I alſo found, in the ſame place, a lump of rock bigger than my fiſt, having a petrified ſhell, and a piece of dark amber, like colophony, with a vein of cinnabar, like a thread, running between. On conſidering the nature of theſe materials, that is, the gypſum,

gypſum, the petrifactions, and the cinnabar, I am of opinion this laſt is of a later date †."

Cloſe to the Port of St. Paul there are ruins of a Roman edifice, and a few years ago a brick oven was diſcovered, containing ſeveral coins of Auguſtus, about a muſket ſhot from the ſea, which confirms the little it has retreated on this ſide.

LETTER XVI.

Road from Alicant to the city of Valencia.

THE beautiful objects which crowd in upon the eye of a traveller, as he moves towards Valencia, are ſuch, and the hand of nature has been every where ſo profuſe, that a writer muſt be poſſeſſed of uncommon abilities to do juſtice to ſo animated a picture, or deſcribe in its proper colours ſo enchanting a vale, enriched with every valuable production. In going from the city of Alicant towards this fertile kingdom, the firſt obſervation that occurs is at the pleaſant village of Ibi, where there are numerous plantations of the garden almond, grafted on the wild tree, which from

† Don Guilfermo Bowles. Page 34.

from the mildneſs of the air produce the beſt almonds in Spain, and will keep very well for eight or ten years, when the others ſoon grow conſiderably rancid. The neighbouring hills are covered with the kermes oak and the common maſtic tree, or *lentiſcus* †, the ſavin, reſtharrow, roſemary-leaved ciſtus, and great quantities of roſemary, which contributes ſo much to the excellence of the honey, that it is ſent even to Rome.

Between Ibi and Biar the mountains are of a calcareous nature, though half way up, they contain flint, which is in requeſt for muſkets. Striking

† Mr. Bowles ſays, he knew an apothecary at Alicant, who uſed to boil the leaves of the *Lentiſcus*, and collecting the ſcum which was left to dry, ſold it for male incenſe, which he imagined to be the ſame as the *olibanum* or frankincenſe, imported from the Levant. The Spaniſh *Lentiſcus*, however, is different from the true maſtic-tree of the Levant, and from which the maſtic is gathered, which is well explained by Mr. Miller in his dictionary, who complains of theſe trees having been confounded by moſt botanic writers, and that even Mr. Tournefort, who was on the ſpot where the maſtic is collected, had not diſtinguiſhed the ſpecies. The Spaniards ſtill follow the old cuſtom of making toothpicks with the *Lentiſcus*, the ſame as the Romans did, of whom Martial ſays,

Lentiſcum melius, ſed ſi tibi frondea cuſpis
Defuerit, dentem penna levare poteſt.

Striking off to the ſouthward towards Villena, ſeveral ſtrata of alabaſter are ſeen on the road cloſed in beds of limeſtone. There is a mine of ocre in theſe rocks, and they frequently find iron. Near Villena a lake of two leagues circumference furniſhes the neighbouring villages with ſalt, and two leagues further, an inſulated hill conſiſts entirely of ſal gem, covered with a gypſeous coat of different colours. After paſſing Villena, a pleaſant and well cultivated vale extends to Caudete and *Fuente La Higuera*, at the foot of a high mountain covered with mithridate. Two fine ſprings iſſue from the hill of *La Higuera*, and form the brook of Rambla, whoſe ſides have ſtrata of red and white earth, which ſhew themſelves and diſappear alternately in proportion as the waters force their way deeper. Following this brook for four hours you come to Mogente, and in three more to Monteſa, oppoſite to which a towering mountain terminates in a pointed rock, on which ſtood the convent belonging to the military knights of the order of Monteſa. On the 23d of March, 1748, a dreadful earthquake overturned this rock, demoliſhed the convent, and buried its inhabitants under its ruins. An unfortunate man in endeavouring to make his eſcape through a crevice of the rock, it ſuddenly cloſed and cruſhed him in ſo terible a manner that when the body was afterwards

wards found, there were hardly any remains ſeen of the ſkull or bones. It is remarkable that in a chain of hills oppoſite to Monteſa, there is a ſteep hill with an old mooriſh caſtle on the ſummit, which never has ſuffered from earthquakes, though frequent in Valencia, owing perhaps to its very perpendicular poſition, being one ſolid and compact maſs, having its root, as it were, deeply fixed under ground, whereas the mountain of Monteſa conſiſted of various ſtrata of ſtone in a horizontal direction, not ſufficiently combined to reſiſt ſuch a violent impulſe.

Near San Felipe the country gradually opens in a moſt rural and fanciful manner; while the eye is ſtruck with new objects; an old ruined caſtle and ſhattered fortifications, on the ſummit of the hill recall to one's mind all the horrors of wa ..d devaſtation, which are ſoon effaced by a chearful valley worthy the pencil of a Claude or Pouſſin; you inſenſibly find yourſelf encircled with mulberry trees, which gives to the whole country the appearance of a pleaſure ground, where a rich cinereous ſoil yields three crops a year, owing to excellent culture, as well as its natural quality, beſides the advantage of water at pleaſure at ſix feet depth, independent of the ſurface being amply ſupplied by the river Xuçar.

Three

Three leagues to the eaſtward of San Felipe, there is a high mountain entirely of marble of three ſpecies, without any fiſſure, white, red, and yellow, which all admit of a very good poliſh, and the fields are covered with plantations of rice far ſuperior to that of the Levant, though yellower, but will keep much longer without acquiring any acrimony *.

I come now to ſpeak of the plain of Valencia, but where ſhall I find words expreſſive of its beauties,

* Mr. Swinburne having given ſo accurate an account of the culture of rice on this ſpot, I cannot offer a more exact deſcription thereof than related by him; which correſponds with Mr. Bowles's information: "In winter they plough out a piece of land, and ſow it with beans that come into bloſſom about March, when they plough them in for manure; water is then let in upon the ground, about four inches deep. It next undergoes a third ploughing, after which the rice is ſown; in fifteen days it comes up about five inches out of the earth, and is pulled up, tied in bundles about a foot diameter, and carried to another well prepared field, covered with water to the depth of four inches. Here each planter ſets the plants of his bundle in the mud in rows at about a foot diſtance one from another. Every ſtem ought to produce from ten to twenty-four fold and grow ſo cloſe that the ears may touch. When ripe it is gathered in ſheaves, and put into a water-mill, where the lower grinding-ſtone is covered with cork; by which means the chaff is ſeparated from the grain without bruiſing."

beauties, ſuch as none can conceive who have not been on the ſpot, and beheld this lively ſcene of natural magnificence. This plain is compoſed of two ſtrata of clay, having a ſandy ſoil or pure ſand between them. On removing the firſt ſtratum, which may be from fifteen to twenty feet deep, they infallibly find water running between theſe two beds; the clay not ſuffering it to filter through: whenever the upper ſtratum is wanting it of courſe overflows that part of the country. This accounts for ſo many lakes in thoſe plains, and for that conſiderable one called *Albufera de Valencia*, which is no more than an extended portion of ſuch a ſituation, where the upper ſtratum has failed, and occaſioned that great lake of freſh water, four or five leagues in circumference, receiving alſo the waters of the river Xucar, and many ſprings and brooks without any viſible increaſe, becauſe its ſurface is ſo extenſive that it loſes by evaporation as much as it receives, and thus always preſerves an equal depth of about two or three feet.

This lake ſupplies the markets of Valencia with fiſh, particularly eels; at certain ſeaſons of the year it is greatly reſorted to by ſportſmen, and covered with boats, as numbers of aquatic fowls delight in this place, and ſometimes they ſee the

flamengo §;

flamengo §; but neither the excrements of ſo many birds, nor the putrefaction of ſo many dead fiſh, afford the leaſt ſymptom of volatile alkali when analyzed, no more than the water of the ſea, notwithſtanding the numbers of fiſh that die in it. The bottom of the *Albufera* is a bed of pure clay, and if by any accident the waters ſhould run off, we ſhould find it without any mixture of ſtone, ſand, or iron, and perfectly ſimilar to the fuller's earth of England.

Amongſt the beautiful ſpots in this country, none exceed or can be compared to a diſtrict in

§ This ſingular bird is ſo called on account of the red or flame-colour of its wings, and feet; it is a ſcarce bird in Europe, and always frequents lakes. They have a tongue not much leſs than a kid's tongue, and which was reckoned a delicious morſel by the voluptuous Romans. When Mr. Peireſc received his friend Le Vayer at his houſe, he entertained him with this diſh, repeating thoſe lines of Martial,

> Dat mihi penna rubens nomen ſed lingua guloſis
> Noſtra ſapit.

Le Vayer wondered why Apicius and the emperors Caligula, Vitellius, and Heliogabalus, had reckoned it ſo dainty a diſh, for inſtead of being exquiſite, he found it rather unpleaſant, with a fleſhy taſte, like that of all water fowl. Therefore the inhabitants of Province generally throw away the fleſh, and only make uſe of the feathers as an ornament to other birds at particular entertainments. See "Life of Peireſc, br Gaſſendi. Tranſlated into Engliſh by William Rand, M. D." London, 1657.

in this neighbourhood, called the *Huerta de Gandia*, yet this enchanting place ſo near to the city of Valencia, is little known to travellers, as it lies on the ſea coaſt out of their track, at a ſmall diſtance from the road, hemmed in by a circular chain of hills, forming an incloſure of about a league and a half diameter. Near the ſea the city of Gandia, capital of the dutchy of that name, offers a new point of view, and from the church ſteeple, you have a noble proſpect of the *Huerta*, and may ſee above twenty villages diſperſed amidſt an infinite variety of verdure and foliage, enriched by a diverſity of fruits. Amongſt the reſt, the blue fig, the glowing pomegranate, and the verdant olive vie with each other in excellence; even the very beach ſeems deſirous of adding a ſhare to this plentiful ſtore, for the prickly pear ſhoots out every where amongſt the clifts of the rocks, and its fruit is free for all who chooſe to partake of it. In this ſeat of bliſs, ſimplicity and perfection fill the mind with delight, and all the laboured powers of invention are outdone; for nature here, as Milton ſays,

> Wantons as in her prime, and plays at will
> Her virgin fancies, pouring forth more ſweet,
> Wild above rule or art.

LETTER

LETTER XVII.

Obſervations made in the city of Valencia and its environs.

FAIR Valencia! how ſhall I deſcribe thy tranſcendant beauties, or ſpeak of thoſe infinite glories that adorn thee? If celebrated architects have not graced thy capital city with ſumptuous palaces, or given a more pleaſing form to thy ſtreets, be contented that the great Architect of the univerſe has poured on thee bleſſings innumerable to render thy happineſs compleat, and make thee the admiration of the world, inſpiring at the ſame time thy ſons with the moſt exalted talents to ſing perpetually thy praiſe!*

The city of Valencia is happily ſituated about three miles from the ſea on the Weſt ſide of the river Guadalaviar, with five ſtone bridges over it, which afford a variety of agreeable outlets from this

* An account of the writers of the kingdom of Valencia only, makes a work of two volumes in folio. See "Eſcritores del reino de Valencia, chronologicamente ordenados deſde el ano 1238 de la Chriſtiana cenquiſta de la miſma Ciudad haſta, el de 1748 por Vicente Ximeno Preſbitero, &c. Valencia, 1749. 2 tomos en folio.

this pleaſant city, exultingly riſing out of a foreſt of mulberry trees, which bring an immenſe wealth to its citizens. The branches of theſe trees are made to grow horizontally, in order to pick the leaves more eaſily, and the trees are pruned every two or three years, to preſerve the leaves ſoft and tender, that the ſilk may be finer, cleaner and lighter than that of Murcia, where the trees are only pruned once in four years, which renders the leaf woolly and tough. In Granada they do not prune them at all, and yet ſuppoſe their ſilk is the fineſt in Spain; but their trees are of the black ſort, and thoſe of Valencia and Murcia are of the white mulberry, for which reaſon the worms of theſe two laſt provinces when carried to Galicia, where they have none of the white ſort, never ſucceed, while the worms of Granada thrive admirably well, in meeting with a ſimilar leaf to that of their own country.

I ſhall not enter into a detail of the manifold branches of cultivation in the environs of Valencia, where nature always ſmiles, and where the very air is conſtantly embalmed with the fragrant perfumes of an infinite number of fruit trees and odoriferous herbs. The cedrats are ſo large as ſometimes to weigh more than ſix pounds, when the tree that produced them is not above two or three feet in height: as to flowers and plants, their beauty and variety are wonderful,

as

as well as the amazing quantities of pomegranates, figs, cherries, pears, and grapes the moſt delicious imaginable, with bunches fourteen pound weight, and every grape as large as a nutmeg. To heighten ſtill more this boundleſs fertility, the intermediate ſpaces between the trees are filled with melons, artichoaks, caulyflowers, and almoſt every ſpecies of pulſe ſupplied with conſtant and copious ſtreams of water, which in a kingdom bleſſed with an eternal ſpring, and where the grim froſt is unknown, ſeems to unite every idea of the golden age of the poets.

The grapes of Valencia and Granada have the preference to all others in Spain. They cannot, it is true, from their diſtance, be ſent freſh to England like thoſe of Portugal, but they ſhip off large quantities of raiſins at Malaga. They prepare them in Valencia with the lixivium of ſeeds whoſe ſalt augments the heat of the water in boiling. The grape is dipped for a moment in this lixivium, when the ſkin burſts on every ſide, and the juice guſhing out candies in the air, after which the bunches are hung to dry in the ſun. The cold weather afterwards perfects this cryſtallization, ſo that when they get to England, they become ſo many cakes of ſugar, infinitely better than when firſt ſhipped off. The raiſins *of the ſun*, as they are called, are ſtill more delicate, having the ſtalk half cut through, while the bunch remains ſuſ-

pended

pended on the vine, and partakes of the heat of the ſun, as the ſap cannot penetrate after they are dried; they are packed up in boxes. This is the method uſed in Granada, which makes them more luſcious and delicate, and juſtly gives the preference to the Malaga raiſins.

As the river Guadalaviar empties itſelf into the ſea, about three miles below Valencia, it is ſaid a plan has been propoſed to deepen the channel of the river, which would be of great advantage to its commerce, as the ſhips lie in an open road in a dangerous ſituation. Much might ſtill be done to enliven and give activity to this agreeable city, formerly known to the Britiſh army, having opened its gates in 1705 to the earl of Peterborough, but after the defeat at Almanza, the duke of Orleans at the head of the Spaniſh forces recovered it again.

There is a pleaſant village about two leagues from Valencia, conſiſting of four ſtreets inhabited chiefly by potters, who make a pretty earthenware of a copper colour with gilding, that ſerves the country people both for ornament and uſe, it is made of an argillaceous earth, very ſimilar in quality and colour to that of Valencia, in which virgin mercury is found: this earthen ware is very gloſſy, and remarkably cheap, but is far from being the beſt ware in Valencia; another manufacture has been lately ſet up at *Al-*

cora, by the count de Aranda, a grandee of Spain, which for the fineneſs of the clay might vie with other manufactures of the kind, were its varniſh leſs liable to crack and ſcale off. †

The famous marble quarry of *Naquera* is three leagues from Valencia; the village is on an eminence, and the quarry is on one ſide near the ſurface in beds of a few inches, formed ſeemingly by the waters. The marble is of a dark red ground, with black capillary veins like a *mocha*, which have a very good effect. Though the beds do not ſink deep, it is hard enough to make ſolid tables, which take an excellent poliſh, and are greatly valued in Spain. Two leagues to the eaſtward of the city there is a quarry of alabaſter, at a place called *Ninerola*, of which ſubſtance many curious pieces of workmanſhip may be ſeen in the houſe of the marquis of Dos Aguas in the city of Valencia. Two leagues from the city, on the banks of the river, the ruins of the antient city are diſcovered; near them they find monſtrous petrifactions of oyſter ſhells, like thoſe of Murcia, mixed with rounded ſand ſtone; but nothing of one or the other is found in the river.

It is an agreeable tour of five leagues from Valencia to Morviedro, famous for the remains of the

† It goes by the name of Count Aranda's ware, and is ſold at Madrid.

the antient *Saguntum* and its Roman theatre, deſcribed by dean Marti * as well as by ſuch Engliſh travellers as have paſſed that way. The plants on the hill of Morviedro and its neighbourhood, are prickly pears, henbane, ſtinking orache, mithridate, capers, marſhmallow and thyme. The view from the top of the hill is moſt beautiful, with an extenſive proſpect of the vale and city of Valencia and the Mediterranean. At a few leagues diſtance from hence to the South Eaſt, beyond a chain of hills, conſiſting of red marble and lime rock, the Carthuſian Monks have a convent ſituated in a perfect paradiſe, where they make excellent wine. The gullies and fields are filled with pudding-ſtone of different ſizes, firmly conglutinated together; their church is built with a ſtone of this kind, veined with white ſpar; but who will inform us whether this ſpar exiſted before or after the conglutination of the ſtone with its natural bitumen? The ſtone is undoubtedly of uſe to the vine, preſerving to its root in the night, the genial heat of the day, while it ſhades it at noon from the ſcorching rays of the ſun. There are two copper mines near this convent.

* The beſt edition of Dean Marti's letters "Aloiſii Martini epiſtolæ," with a plate of Saguntum, in 4to, was printed in Holland from an edition 2 vol. in 12mo, and the life another volume by Mayans, printed at Madrid by Sir Benjamin Keene. This edition is now ſcarce and dear in Spain, and the Dutch edition is better.

To return to the plains of Valencia, it would be an endleſs theme to enlarge upon its products; they cultivate great quantities of medick or lucern *(trifolium Hiſpanicum)* which is acceptable to horſes, and makes excellent hay. The Spaniards call it *alfalfa*. Its roots make little bruſhes for the teeth, they are ſought after by dentiſts. The *chirimoya*, a very fine fruit from South America, thrives and bears fruit in Valencia; in a word, every production of nature may be ſaid to proſper in this kingdom ‡, for here we find corn, wine, oil, honey, flax, ſugar, cotton, rice, ſilk,

‡ The following ſketch exhibits the value of the principal products of Valencia.

Silk crop annually about 1.500.000 lb. of 12 ounces, which ſells on the ſpot, at a price equal to 10 *s.*		£. 750.000 ſterling.
400.000lb. wt. Engliſh, or 20.000 ton of rice for home conſumption, at 15 *s.* per pound.		300.000
150.000 lb. Barilla,	at 10 *s.*	75.000
80 000 Raiſins,	7 *s.* 6 *d.*	30.000
10.000 Kernels of almonds	for export. 40 *s.*	20.000
10.000 Pipes of brandy	10 *l.*	100.000
10 000 Wine	4 *l.*	40.000
		£. 1.315.000 ſterl.

Beſides great quantities of wool, aniſeeds, cummin ſeeds, and many other ſmaller articles, and a large quantity of oil

ſilk, beſides fruits, and plants, producing all together near ten millions of dollars per annum. Few cities enjoy a more temperate air, or have more beautiful environs. The *Alameda*, or public walk, is one of the moſt pleaſing in Spain; if we add to the variety of its beautiful trees, the gaudy equipages and numerous concourſe of people that reſort there, it forms ſo pictureſque a ſcene enlivened by the fields, with a view of the city and bridges, as ſeems to ſurpaſs the utmoſt power of deſcription; and were public ſpirit equal to its natural bleſſings, would nearly reſemble the marvellous ſcenes of romance! Such is the beautiful Valencia, like the garden of Paradiſe in Milton:

A happy rural ſeat of various view;
Groves whoſe rich trees wept odorous gums and balm,
Others whoſe fruit burniſh'd with golden rind
Hung amiable! Heſperian fables true,
If true, here only, and of delicious taſte.

LETTER

oil for home conſumption. Nothing is mentioned in this account, of cotton, which is a conſiderable article. I ſhall now ſtate the whole, as given us by Mr. Swinburne, and reduce it into Engliſh money, as it makes the annual revenue much more conſiderable.

Silk crop of 1775, one million of pounds at 4 dollars per pound (though a good deal of it ſells for 3 dollars.)	4.000.000 dollars.

Fruit

LETTER XVIII.

Journey from Barcelona to the mountain of Montſerrat.

THE city of Barcelona is generally reckoned one of the moſt agreeable places in Spain. Its pleaſant ſituation, its commerce, with the activity and induſtry of its inhabitants, contribute to make it a place of ſplendor and affluence †. In this city the traveller will find a curious cabinet of

Fruit of different kinds - -	2.000 000
Hemp at 3 dollars per arrove - - -	300.000
Rice at 10 dollars per load - - - -	1.400.000
Cotton 450.000 arroves - - - - -	1.350.000
Vintage of 1767 wine, at 3 reals per meaſure	861.135
	9.911.133 dollars.

Which ſum of 9.911.933 *dollars. at* 40 *d. ſterling per dollar, is* £1.655.855. 10 *s. ſterling.*

* The Engliſh merchants ſeem to have ſettled later at Barcelona than in other commercial towns in Spain. Mr. James Howel, in a letter from Barcelona, dated 24th Nov. 1620, to Sir James Crofts, ſays, "In this place there lives neither Engliſh merchant nor factor, which I wonder at, conſidering it is a maritime town, and one of the greateſt in Spain, her chiefeſt arſenal for gallies; but I believe the

of natural hiſtory belonging to a private citizen, Mr. Salvador, an eminent apothecary, who ſhews his collection to ſtrangers with the utmoſt urbanity. *

The celebrated mountain of Montſerrat, nine leagues from Barcelona, has of late been ſo fully deſcribed by Britiſh travellers, a fine print having been lately exhibited of it *, that the ſubject is become exhauſted, and words ſeem feeble to deſcribe this awful mountain, raiſing its exalted creſt towards the ſkies, with all the powers and majeſty of nature; yet as it makes ſo capital a figure in the geography of Spain, we ſhall once more aſcend its jagged rock, and explore its wonderous form.

The firſt ſtage from Barcelona leads to the town of Martorel, at the conflux of the rivers Noya and Lobregat; here you are ſenſibly ſtruck with the tremendous appearance of this grand and ſolemn mountain, impreſſing on the mind the moſt exalted ideas, in viewing this wonderful effort of nature.

the reaſon is, that there is no commodious port for ſhips of any burthen but a large bay." The new mole however has rendered this port more convenient, and immortalized the memory of the late marquis de la Mina, captain general of the principality, under whoſe orders it was erected.

* In Mr. Thickneſs's travels into Spain.

nature. You ſeem quite cloſe to it, but have ſtill three hours in the uſual method of travelling in Spain to approach its baſis, and as many more after to climb up to its ſummit. There is a famous bridge over the Lobregat at Martorel, with an arch at its foot; it has been lately repaired, as appears by the following modern inſcription placed on it.

POR LOS ANOS DE 533 DE LA FONDACION DE ROMA FUE CONSTRUIDO ESTE ADMIRABLE PUENTE POR EL GRANDE ANIBAL CAPITAN CARTAGINES Y HIZO EREGIR EL ARCO TRIUMFAL QUE AUN EXISTE A SU SALIDA EN HONOR DE SU PADRE AMILCAR. DESPUES DE 1985 ANOS DE DURACION SE HALLAVA ESTA FABRICA MUY MALTRATADA Y EN ESTADO DE ARRUINARSE ENTERAMENTE PERO AFIN DE CONSERVAR UN MONUMENTO DE TAN RARA ANTIGUEDAD LO MANDO REESTABLECER EN ESTE ANO DE MIL SIETE CIENTOS Y SECENTA OCHO, LA MAGESTAD DEL SENOR DON CARLOS REY DE ESPANA A SOLICITUD DEL EXMO SENOR DON IUAN MARTIN DE ZERMENO COMANDANTE GENERAL DEL CUERPO DE INGENIEROS, &c. &c.

In ENGLISH.

This admirable bridge was erected in the year 533 *of the building of Rome, by the great Hannibal, a Carthaginian captain, and he raiſed the triumphal arch which ſtill exiſts at its foot, in honour of his father Hamilcar. This fabric, after having ſtood* 1985 *years, was greatly damaged and in a ruinous ſtate, but his Majeſty Don Carlos King of Spain, in order to preſerve ſo rare a monument of antiquity, ordered it to be repaired in the year* 1768, *at the entreaty of his excellency Don John Martin de Zermeno, commandant general of engineers, &c. &c.*

Martorel is a large town, replete with induſtrious inhabitants, all employed and conſtantly at work; the women in making black lace, and the men in various uſeful and laborious occupations; a little further on, at the village of Eſpalanguera there is a manufactory of cloth, which maintains numbers of families; the ſame ſpirit of labour and application is univerſal every where in Catalonia; but we now draw near to the lofty mountain of Montſerrat, the moſt ſingular perhaps in the world for its appearance, compoſition, and productions; as much the admiration of the naturaliſt, as revered by the natives in general, from the renown of its ſanctuary, famous for miracles and the extraordinary favours granted by our lady of Montſerrat to its numerous votaries.

This

The whole extent of this mountain may be about eight leagues in circumference, its chief materials conſiſting of round limeſtone, firmly conglutinated with a yellow calcareous earth and ſand, not unlike the *Brechia* or pudding-ſtone of Aleppo, only that the grain is coarſer and the ſtones larger than that of the Levant, with a further addition of round white quartz ſtreaked with red, as well as touchſtone, all firmly cemented together, forming one perfect ſolid maſs; and according as the natural bitumen which united all theſe together, has occaſionally given way in the courſe of fleeting years, various torrents of rain water have rolled down and waſhed away the earth, the reſult of their decompoſition, and have ſplit the mountain into an infinite variety of ſhapes and ſingular appearances, forming in ſome places the moſt amazing clefts and frightful precipices: in others huge pieces of blanched and bare rock ſhoot up into ſharp cones, pillars, and jagged forms, from twenty to a hundred feet high, exhibiting wonderful aſpects that ſtrike the eye with ſurprize and the mind with aſtoniſhment! its wildneſs increaſing in proportion as you advance higher, inſomuch that on reaching the ſummit of this enormous pile, human reaſon is loſt in conjecture; but the ſight is gratified with the moſt ſplendid proſpect, looking down on an extenſive kingdom beneath you as on a map, exhibiting a fertile country

try to the South, ſtudded with villages and watered with rivers; the eye ſtretching out further over the Mediterranean, the landſcape is rendered ſtill more ſtriking from the contraſt on the North and Eaſt, bounded by the bare and dark mountains of the Rouſſillon, and the ſnowy tops of the Pyrenees. On theſe inhoſpitable cliffs of Montſerrat, amidſt the conſtant inclemency of jarring elements, dwells the pale hermit, with hairy gown, wrapt up in ſilent contemplation. Here he has hewn a ſolitary dwelling and offers up his fervent prayer, and takes his lonely walk, lifting up his eyes, muſing

> Of every ſtar that heav'n doth ſhew,
> And every herb that ſips the dew.

But though the elements have wreaked their fury upon theſe elevated peaks, the indulgent hand of nature has not been ſparing in her gifts to this ſurpriſing mountain, as numberleſs evergreens and deciduous plants ſerve to adorn the various gaps and breaks which its ſingular ſhape admits of, rendering it a curious repoſitory of the vegetative kingdom. The lower part of the mountain has decompoſed much ſooner than the upper parts and turned into ſoil, productive of corn, vineyard olive, while the ſhelving rocks facilitate a paſſage to the ſummit, and exhibit to the botaniſt a view of above two hundred ſorts of trees, ſhrubs, and

and plants, that ſhoot up ſpontaneouſly, gracing this hoary and venerable pile; amongſt others the ſcarlet oak, three different kinds of juniper, baſtard alaternus, mock privet, the lote or nettle tree, the ſcorpion ſena, the perennial ſtrawberry tree, roſemary, gorze, thyme, fern, and towards the top the ſtinking trefoil of the ſea ſhore of Valencia, and the rough bind weed of Andaluſia and Biſcay, proving that theſe plants grow equally in cold and warm climates.

Here we find the touchſtone, or *lapis lydius*, known to Theophraſtus the diſciple of Ariſtotle, who ſays it was found in the river Tmolus in Lydia, and that the upper part was better for eſſaying gold than the lower, adding, that theſe ſtones appeared to be pebbles, and as they were not round, it was inferred they were fixed in the earth, and were never waſhed away by the rivers. The moderns make uſe of acids with greater advantage for the eſſaying of gold, by comparing a line drawn on the ſtone with gold of a known ſtandard, to another line which they want to eſſay, for as aqua fortis has the property of diſſolving all metals except gold, the colour and diminution of the lines compared together, will ſhew what allay they have, with little danger of error. From hence it is plain the touchſtone is not limy, otherwiſe it would diſſolve in the acid, and the only quality required is to receive the line drawn

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on it, and not diſſolve in aqua fortis, nor is its colour of conſequence, though the blacker is preferable, as ſhewing the gold better. This is the colour of that found in the Tmolus, the Baſaltes or cryſtalized rocks, in many parts of Saxony, in the mountain of Uſſon in Auvergne, the Giants Cauſeway in Ireland, and theſe of Montſerrat. They are all indiſſoluble in acids, and of a different nature from marble, which being limy would not anſwer the purpoſe, as the aqua fortis would carry away the ſtone jointly with the metal it diſſolved; thus true touchſtone being o a very hard nature, all vapour and moiſture condenſe on its ſurface; it muſt therefore be carefully rubbed and wiped dry before it is uſed, that the adheſion of gold may be perfect. Theophraſtus, though a great man, reaſoned according to the philoſophy of his age, which made him imagine that marble would ſweat, when the dampneſs proceeded from the ſmooth texture and coldneſs of it, condenſing, and rendering viſible the moiſture diſſolved in the air.

The direction of this great mountain is from eaſt to weſt, with a viſible inclination to the weſt. Thoſe who adopt the ſyſtem of the formation of mountains, from a ſucceſſive depoſit of ſediment from the ſea, will find it difficult to reconcile their hypotheſis with the ſtructure of the mountain of Montſerrat, as it is no eaſy matter to diſcover how the

the ſea could give a round ſhape to the ſtone, or how quartz, ſandſtone or touchſtone, could conglutinate ſo firmly together; but this muſt be left to more able pens to diſcuſs: I ſhall only add, that it is impoſſible to view this amazing mountain without the utmoſt admiration; its name has been extended to one of the Britiſh iſlands in the Weſt Indies, and its fame is univerſal: its prodigious clefts impreſs the mind with ſuch wonder, that it has given riſe to the opinion in common with Gaeta in Italy, § that theſe tremendous rocks were ſuddenly rent in this manner when our Saviour gave up the ghoſt on the croſs, when "*The earth did quake, and the rocks rent.*" *St. Matt. c.* 27, *v.* 51.

LETTER

§ The ſingular rock of Gaeta in the kingdom of Naples, has an amazing cleft from the top to bottom, and is totally rent aſunder, which they tell you happened at the death of our Saviour; a large block of marble has fallen in between, on which they have built a little chappel, dedicated to the Trinity, and ſhips paſſing near ſalute it; this place is held in great veneration, particularly in Spain; during the wars in Italy, *La Santiſſima Trinidad de Gaeta* was greatly reſorted to, and a conſtant invocation. There is a good plate of this rock in the "remarks on ſeveral parts of Europe by John Breval, Eſq; author of the former remarks. London, 1738."

LETTER XIX.

Singular mountain of foſſil ſalt, near the town of Cardona, in Catalonia, as deſcribed by Don Guillermo Bowles.

THE town of Cardona is ſixteen leagues from Barcelona, at no great diſtance from Montſerrat, and near the Pyrenees. It ſtands at the foot of a rock of ſalt, which on the ſide of the river Cardonero appears cut perpendicularly, forming a maſs of ſolid ſalt between four and five hundred feet high, without the leaſt crevice, fiſſure, or ſtrata, nor is any gypſum to be found in the neighbourhood. This amazing rock is about a league in circumference, and much about the ſame height as the adjacent mountains, but its depth being unknown, it cannot be aſcertained on what baſis it reſts. The ſalt is commonly white from the bottom to the top, though in ſome parts it is red, which the people of the country cut into pieces like bricks, and think it of uſe for pains in the ſide, by applying it to the part after being moderately warmed; ſometimes it is of a light blue, but theſe colours are of no importance, as they diſappear in grinding, the ſalt remaining white, and being eatable, having no flavour or taſte either of earth or vapour.

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This prodigious mountain of ſalt, diveſted of any other ſubſtance, is unparalleled in Europe; philoſophers have an ample field to ſtudy its formation; it will not be ſufficient to ſay, it proceeds from an evaporation of the ſea, as this will not be deemed ſatisfactory.

In the ſhop of a ſculptor at Cardona, I purchaſed ſeveral figures, candleſticks, caſkets, and other toys cut out of this ſalt, as tranſparent as cryſtal: when one of the workmen was carving a candleſtick, I obſerved he wet it with water, then rubbed it dry with a towel, and wiped off the white powder which enſued on the working of it, and gave it a greater tranſparency. The ſalt is ſo hard and compact that water will not diſſolve it if it is ſoon rubbed dry again.

This mountain has a conſiderable ſurface, nevertheleſs the rain does not diminiſh the ſalt.* The river which runs at its foot is briny, and when it rains the ſaltneſs of the water increaſes, and kills the fiſh; but this effect does not extend above three leagues, beyond which fiſh live as uſual.

After many experiments which I made with the water of this river by evaporation diſtillation, and various

* Perhaps not ſenſibly; but how ſhall we otherwiſe account for the addition of ſalt to the water mentioned in the next ſentence.

various different proceſſes, I never could diſcover in it, the leaſt grain of ſalt, which perſuaded me that the ſalt was entirely decompoſed by motion, and diſſolved into earth and water. The water of the Tagus, which paſſes between hills of gypſum and ſal gem, at Aranjuez, is bad in that ſpot, but at Toledo it is good; ſoap eaſily diſſolves in it, and a little lower down, if it is diſtilled, not the leaſt particle of gypſum or ſalt is to be found.* If we burn ſulphur, arſenic, pitch, or other combuſtible matters at the foot of a tower, none of thoſe that are near it can bear the ſtench, while thoſe above will not perceive it; becauſe it entirely decompoſes into water and earth before it reaches them, and the inflammable principle which is inodorous riſes anew to form freſh combinations, and occaſion thunder and lightning. I ſhould think the emanations of malignant fevers, and of the plague, follow the ſame laws.

It is commonly ſaid, that of the three acids of nature, the nitrous, which is the ſecond in ſtrength, ejects the marine, which is the third and the weakeſt, but experience is contrary to this doctrine, ſince in Spain the ſal gem ejects the nitrous acid from its baſis: grind twenty-four ounces of this ſalt with twelve of ſalt-petre, let them be diſtilled in

* Theſe curious facts merit a further examination, as the preſent illuſtration is by no means ſatisfactory.

the uſual manner, and the reſult will be a very good aqua fortis, which will readily diſſolve ſilver, and have no effect upon gold. The ſilverſmiths of Madrid uſe no other. To clear up more fully this ſingular phenomenon, and ſee whether the chemiſts are miſtaken or not, nothing is left but to aſcertain whether this ſal gem contains a vitriolic acid, becauſe in ſuch caſe it would not be the marine acid that was more powerful than the nitrous, but the vitriolic: however as it has not been demonſtrated or known, that any ſuch vitriolic acid exiſts in common ſalt, the difficulty ſtill remains. This ſingularity of the Spaniſh ſal gem merits the attention of chemiſts and repeated experiments; as this ſyſtem ſeems to militate againſt the received opinions concerning the nature of the three acids, the maſter-key of chemiſtry, and overturns the theories now in vogue.§

What rhapſodies have been publiſhed with reſpect to the phyſical cauſes of the ſaltneſs of the ſea, ſome ſaying that immenſe beds of ſalt exiſted at its bottom; others, finding this argument deſtroyed itſelf, had recourſe to the id[illegible]

§ Mr. Bowles ſeems r[illegible] too haſtily, without [illegible] certain degree an[illegible] alone be depri[illegible] [illegible] a much [illegible] [illegible]

ing down ſalt enough to the ſea to impregnate its waters, which ſuppoſition is as falſe as the former, as we are poſitive that ſea water is at preſent as briny as it was in ancient times in proportion to its ſituation, temperature, evaporation, or quantity of freſh water running into it; beſides this, I have made ſeveral experiments, but never found ſalt at the mouth of rivers, where they diſembogue into the ſea. It is true, that ſometimes after diſtillation and evaporation I have found a thouſandth part of common ſalt, and I once diſcovered as a *reſiduum*, a little nitre; but this proves nothing, and with reſpect to the nitre, I conſider it to be a *reſiduum* of common ſalt, being perſuaded that this may change its acid and alkaline baſis, and become nitre with motion and ebullition, and reciprocally nitrous, and the alkaline baſis change into common ſalt.†

† It would have been acceptable to the chemical readers, if Mr. Bowles had favoured us with any ſufficient reaſon to ſupport this belief.

LETTER XX.

Obſervations made by Don Guillermo Bowles, on the roundneſs of pebbles in the beds of rivers.

THE pebbles of which I am now going to ſpeak, are thoſe which are commonly found in moſt places without angles, or points, and though not perfectly round, have yet more or leſs that form, with a ſmooth ſurface. They are compoſed of various matter, and the firſt idea which occurs of their having acquired this ſmoothneſs, is from their rubbing againſt each other, or ſome harder body; this being the method we uſe in order to give ſuch a poliſh to any ſubſtance, and as theſe ſtones are frequently found in large quantities in the beds of great rivers, it is very eaſy to ſay they have been brought down by the waters, and become ſmooth by their conſtant friction. For my part, I was always of this opinion till my arrival at Aranjuez, where I diſcovered the fallacy of this reaſoning, for I clearly perceived that the ſtones in the bed of the Tagus never moved from their places. This of courſe ſtaggered my former belief; I was confirmed in my new principles by a variety of obſervations, but to avoid being prolix I ſhall only offer a few

a few of them, which have all the appearance of being deciſive in favour of my ſyſtem.§

There are no pebbles more ſingular than thoſe cryſtalline ones found in the bed of the river Henares, near San Fernando; now if theſe pebbles had any progreſſive motion, let it be ever ſo ſmall, they ought certainly by this time, after ſo many ages, to have reached the bed of the Tagus ſo near them, yet none are to be found there.

The Tagus is full of calcareous ſtone at Sacedon; a little lower, at Aranjuez, not one of theſe is to be found in its bed.

The kingdom of Jaen near Linares, there is a hill chiefly compoſed of round ſmooth ſtones, about the ſize of an egg; the ſmooth poliſh of theſe and their roundneſs cannot be attributed to rains, becauſe they are not expoſed to them, nor diſperſed on the ſurface of the hill, but buried underneath at a conſiderable diſtance: nor much leſs can it be attributed to any river, for I do not know from what ſyſtem, or by what chronology, it may be conjectured that any river ever run over that eminence.

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§ Mr, Bowles tells us, he looks upon this as one of the happieſt diſcoveries he ever made, as ſtriking him in a forcible light, and ſerving as a key tending to illuſtrate the true phyſical theory of the earth; but in what manner it had this effect he has not informed us.

In the village of Maria, three leagues above Zaragoſſa, there is a broad gully full of quartz, ſandſtone, and limeſtone, and gypſum of a perfect white, yet at Zaragoſſa the Ebro contains none of theſe ſorts.

I believe no body has ever ſeen in the bed of the Ebro large or ſmall round granite ſtone, nor blueiſh ſtone veined with white, but the Cinca before it empties itſelf into that river is full of them: in ſo much that it carries no other ſand but theſe ſtones reduced very ſmall, near San Juan in the valley of Giſtau.

The river Naxera is full of ſmall ſandy ſtone, and of white quartz reſembling little almonds, mixed with others of a red colour. This river runs into the Ebro, in whoſe bed when it paſſes by Zaragoſſa, none of theſe ſorts of ſtones are to be ſeen.

The bed of the Guadiana has in its different parts the ſame kind of pebbles as are found on its banks, and on the adjacent hills, without being mixed with thoſe that are found a league higher or lower; and at Badajoz, where the country is without any ſtone, none are to be found in the bed of the river.

This holds good not only in Spain, for I have taken notice of the ſame in other countries; not

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to multiply examples, I ſhall only offer what has fallen under my obſervation in France; the river Alier at its ſource, about half a league from Varenne, contains a great variety of pebbles, of red and yellow quartz, of the ſame nature as thoſe in the fields in its neighbourhood; but I could not diſcover one of theſe pebbles in this river, when it paſſes by Moulins, where nothing is ſeen but coarſe ſand.

The Loire at its ſource runs over an immenſe quantity of ſmall pebbles, lower down, none are to be ſeen when it paſſes by Nevers, where the bed of the river conſiſts of ſand and large pebbles the ſame as the adjacent fields.

There is a great deal of pebble and flint in the river Jonne, before and after it paſſes from Sens, becauſe its banks are covered with it from Joigny. The Jonne enters into the Seine above Paris, and yet I do not believe any body has ever ſeen one of theſe pebbles go through the *Pont neuf*, and what is more, nobody has ever ſeen the Seine bring any ſort of limy pebble along with it in paſſing through Paris, either round or of any other ſhape.

What happens in the Rhone is ſtill more concluſive, and as ſeveral writers have ſpoken of it and of the Lake of Geneva in a manner which is incom-

incomprehenſible to me, I ſhall briefly relate what I have ſeen. A valley flanked on one ſide in part by the Alps, and on the other by Mount Jura, forms the Lake of Geneva, which is about eighteen French leagues in length: a ſmall river with a great many brooks falling from the mountains on its ſides fill the cavity of the valley, and the water which overflows, forms the river Rhone near the city; as its depth there, is leſs than in the centre, and the water extremely limpid and tranſparent, the pebble is ſeen at the bottom covered with moſs; the waters even with the higheſt winds never moving them from the firſt ſpot where they fell in. The Rhone after it has quitted the lake runs for ſome leagues over a bed of pebble, and then enters a narrow gorge formed by two rocks cut perpendicularly, then paſſes by the mountain of Credo, at whoſe foot the river diſappears, for reaſons very different from thoſe with reſpect to the Guadiana.

The Credo mountain is a compoſition of ſandy earth full of round ſtone, from its ſummit to a conſiderable depth. There is another ſimilar mountain oppoſite to it in Savoy, likewiſe full of ſandy, limy pebble, granite, and flint; the Rhone paſſes between theſe two mountains: as the baſis of the Credo conſiſts of ſtrata of limy rock of different degrees of hardneſs, the waters in courſe of time have

have eaten their way through ſuch beds as happened to be of a ſofter nature than thoſe above and below, and made themſelves a paſſage between them. I croſſed the upper rock, which penetrates the baſis of the two mountains, and over the river, went from France to Savoy in leſs than a minute, as it is not forty paces from one ſhore to the other. This ſingular vault is pierced in ſome places, and the water guſhes out at the apertures, foaming like boiling water amongſt thoſe enormous pieces of broken rock. This is what is commonly called *La Perte du Rhone*, and may be about ſixty paces in length. At another place it is leſs, about a muſket ſhot higher up, from a ſimilar cauſe, of the river meeting with a ſtrata of leſs reſiſtance, where it has formed a paſſage which it enters with no inconſiderable violence.

This phenomenon being explained, I reaſon in this manner: If ſtones were carried forward by the motion of the rivers, theſe cavities through which the Rhone paſſes ſhould be full of them, for though the ſtrength of the current would hurry them forward, there are ſo many holes at the bottom, and ſo many detached pieces of rock to ſtop them, that ſome would unavoidably be interrupted in their paſſage, and many be found there, but I could not diſcover the leaſt appearance of ſuch, notwithſtanding that the bed of the river from

from Geneva to this place is in a manner crouded with them. I therefore conclude that theſe pebbles never move from their place; and what is ſtill more convincing, there is not a ſingle pebble in theſe vaulted places, excepting ſuch as are found on the banks of the river, in the long courſe of which there are many of all ſhapes and ſorts, at leaſt as far as Lyons; nevertheleſs I do not believe any one has perceived ſuch ſtones at its entrance into the ſea, nor in the gulph of Lyons, where this river loſes itſelf.

I will add one obſervation more, though perhaps I have given too many already. A few paces from the occultation of the Rhone you croſs the river Valſeline, which has its ſource near Nantua, in the high Bugey. The bed of this river is full of pebble, becauſe the hills and plains through which it paſſes are equally ſo. There is a place where it forms a cataract with great violence, when the water runs into a cavity; now if it brought any pebbles along with it, they would certainly be found in this cavity, but it is a fact that none are to be found there. When I went to Geneva I threw ſome remarkable ſtones into the river above this gap, and at my return I found them in the very identical ſpot without having been moved in the leaſt.

If I am aſked how all theſe pebbles come to be ſo round and ſmooth, and to have loſt their ſharp points,

points, I ſhall freely acknowledge that I do not know the reaſon, that I have ideas of my own concerning them, but do not venture to inſiſt on them. Any hypotheſis would have more weight with me than the common one, that the motion of waters or rivers has been the cauſe of the roundneſs of ſtones, for who can have reſolution to embrace a ſyſtem which would engage him to hold that the Rhone for inſtance had traverſed the ſummit of the mountain of Credo, one of the higheſt in the world, all compoſed of ſuch pebble; and the ſame reaſoning muſt be allowed to many other mountains with ſimilar appearances in different parts of the world.

Sometimes, it is true, ſtones and pieces of rock are hurried forward in rivers, and brought down by torrents after ſtorms; the ſame may happen in ſtreets and cities, but this is not extraordinary, when the declivity of the ſituation is conſidered, which gives additional power and force to the water, occaſioning a natural effect, which ceaſes when ſuch bodies come to a place where they will be at reſt. This will account for ſuch ſtones as have been rolled down into the beds of rivers by their natural weight, when the earth which ſupported them has given way.

Suppoſing then this notion to be exploded, the difficulty ſtill remains to account for their ſmoothneſs

neſs and roundneſs, which is no eaſy matter to explain, being involved with many perplexing circumſtances, which I ſhall leave to be elucidated by others more intelligent than myſelf. It is certain that water and time are two powerful agents that can bring about ſurpriſing effects. The world is full of theſe round ſtones of various ſizes and appearances, they are found in vallies, on hills, and at a conſiderable depth in the earth, as well as on the ſummit of the higheſt mountains. I have ſeen round diamonds covered with a light ſcurf, ſapphires and oriental topazes round like cornelians. The cryſtal of the Rhine never becomes round, becauſe in its natural ſtate it is not angular, and forms a maſs already round, the reverſe of common rock cryſtal, compoſed of *lamin*æ of a regular ſhape. Many of the learned have been deceived by theſe cryſtals of the Rhine, thinking, becauſe they found them at two leagues diſtance from Straſburg, in the midſt of the fields, that the river has altered its bed, entertaining that fond notion, of the waters carrying them along; at the ſame time, they did not conſider that they are not to be found a few leagues above Dieux Briſac, nor any where below Straſburg. Therefore if theſe rivers carried ſuch pebbles in their courſe, they would have them at their mouth, where they enter the ſea, and there would be no ſand banks at theſe places, for the ſtones would fill up the cavities, and

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the waters would roll over them, which certainly is not the caſe. The very bottom of the ſea would ſuffer ſome change from the great quantities of ſtones brought down by ſo many rivers, and forced into its bed, from whence it would follow, that the obſervations of the ſounding line would no longer be of uſe to the mariner, who always finds the ſame bottom when he heaves the lead at one time as at another.*

LETTER

* True with reſpect to the Britiſh Channel, and of which I have been often an eye witneſs, and ſeen the ſame kind of ſand, ſmall ſhells, and pebbles, brought up at the bottom of the lead as were deſcribed in charts publiſhed many years ago, by which the mariner on entering the channel in a dark winter night can know in what part he is in; but this is not the general uſe of the ſounding line, which is thrown out occaſionally, to know the depth of water, and number of fathoms, when approaching the coaſt, or amidſt ſhoals, and in every ſituation of danger. Will Mr. Bowles perſuade us, contrary to ocular conviction, that great quantities of pebble are not daily thrown up upon the beach by the waves, and choak up the mouth of harbours, while others are brought down by rivers with ſimilar inconvenience?

LETTER XXI.

Deſcribing the hot wells at Caldas in Catalonia, and thoſe of Caldetas, near the city of Mataro.

AS I had not an opportunity of viſiting the hot wells and baths of *Caldas* in Catalonia I was favoured with the following account of their ſituation and preſent ſtate, by my worthy friend William Gregory, Eſq; his majeſty's conſul at Barcelona.

"There are ſeveral hot wells in the neighbourhood of Barcelona, but the principal ſpring is at Caldas de Monbuy, about five leagues North of Barcelona. The town takes its name from the waters, but at preſent is much decayed and dwindled into a very inconſiderable place, with a few priviledges to ſupport its rank as a town, though it was once the capital of a diſtrict inhabited by a people known in the earlieſt periods of the annals of Catalonia, under the denomination of *Aquicaldenſes*, of whom frequent mention is made during the conteſt between Rome and Carthage for the dominion of that part of Spain, ſometimes taking part with one ſide, ſometimes with the other. The greateſt part of a ſlight antient wall remains, as alſo its four gates, which are ſtill kept in repair; but the caſtle of the lord of the manor,

nor, though of a late date in compariſon with the reſt, ſeems to have been abandoned for ſome years, and is in a moſt ruinous condition. Caldas is ſituated in a very romantic part of the country, which riſes into abrupt hills all round, and in a manner encircle it. Theſe hills, or rather mountains, are for the moſt part covered with olive groves, which yield a conſiderable quantity of oil, for the extraction of which the hot water that flows ſo plentifully in the town is of infinite uſe. As this is at preſent in no wiſe recommendable, either for its elegance or accommodations, you may well imagine that the baths are not much frequented with a view of diſſipation or pleaſure, but numberleſs are the votaries of health that viſit it from all parts of the country in ſpring and autumn, and they are accommodated in the beſt manner that a Spaniſh country town can afford. Some of the apothecaries, and many of the private houſes at Caldas have neat baths for thoſe that chooſe to hire them; and there is an hoſpital where the poor are admitted gratis. Various are the virtues that this water is ſaid to poſſeſs, and many the cures that it daily performs, in ſcorbutic, ſcrophulous, as well as rheumatic complaints, ſtiffneſs in the joints proceeding from old wounds, &c. I cannot however pretend to deſcribe to you any of its particular qualities, ſuch as what mineral it is chiefly impregnated with,

or

with, or the cauſe of its extraordinary heat, or any part of its analyſis, having had but little time during my reſidence in that country for the inveſtigation of things of that ſort, and I never found any of the inhabitants that could give me ſatisfactory account about the matter, all that I know of from my own obſervation, is that it riſes much hotter than either the ſpring near Aix la Chapelle, or thoſe of Bath or Briſtol; it is boiling hot, and the people of the town come conſtantly there to boil their eggs, cabbage, and all ſorts of vegetables, by ſimply ſuſpending them under the ſpout of the fountain in a baſket, and yet make uſe of no other water, when ſufficiently cooled, for drinking either alone, mixed with wine, or cooled with ſnow in orgeats, ſherbets, &c. Some years ago there was a ſhort treatiſe written on the qualities of theſe waters by ſome well-diſpoſed and intelligent perſon; a few detached ſheets of this work once fell into my hands, when I was at Caldas, but the whole edition has now ſome how or other diſappeared. The general opinion is, and I believe not without foundation, that ſome invidious perſons after the deceaſe of the author, made a point of buying up the work, and have ſecreted or deſtroyed every page of it, except here and there a few copies that fell into the hands of ignorant people who tore them to pieces without conſideration.

Another

Another hot ſpring flows in the village of *Caldetas*, which likewiſe takes its name from the waters, like the former, though expreſſive of a leſs degree of heat in the water, as well as the inferiority of the place in reſpect to the other. This village is about two miles from the city of Mataro, near the ſea ſide, and is alſo frequented by perſons afflicted with the above-mentioned complaints in a ſlight degree, for the water being only tepid, it has not the efficacy of the hot water at *Caldas*. Thoſe of Caldetas are alſo taken as a purgative, and are not fit for any culinary purpoſe. You will eaſily conceive that thoſe watering places differ widely from what are ſo called in other countries, being ſolely frequented by the infirm out of *pura neceſidad*, and are therefore indifferently ſupported; was the beneficial improvement of England to take place, it would in a ſhort time extend the reputation of theſe ſalutary waters, and make them rival, if not out-do Spa, Aix la Chapelle, Bareges, and moſt of the noted places on the continent, over all which the famous baths of Caldas have ſuch an undoubted ſuperiority in point of climate and ſituation.

LETTER XXII.

Remains of ancient volcanos in Spain.

IT is not my intention to advance or add any new hypothetical theories to the many that of late years have been offered relative to the grand ſubject of volcanos, and how far in conjunction with earthquakes they have been the powerful cauſes of the great inequalities and ſhattered condition of the ſurface of the earth. Varieties of ſpecimens of rock, ſtones, and earths, bearing evident marks of a former fuſion or calcination, have been collected, though found in places where no volcanos at preſent exiſt, yet leaving no doubt of their having formerly exiſted, and that ages have elapſed ſince their extinction: this ſubject of late years has more particularly engaged the attention of curious travellers, and ingenious writers of different nations. Sir William Hamilton, his Majeſty's envoy at the court of Naples, has not only given a more perfect account of the eruptions of Veſuvius, but has conſiderably enlarged the field, and brought to light new and important diſcoveries, with reſpect to the volcanic eruptions of Italy. Thoſe of France and different parts of Germany have been likewiſe laid before the public, but thoſe of Spain remain ſtill unobſerved,

unobſerved, and Mr. Bowles appears undoubtedly to be the firſt who has diſcovered any remains of volcanos in that kingdom, which is the more remarkable, in a country where they have ſo many individuals that muſt have ſeen thoſe famous ones of Pinchina, Cotopaxi and Chimboraſo in Peru, the moſt extraordinary and amazing volcanos in the world; with reſpect therefore to the Spaniſh volcanos, I ſhall confine myſelf to ſuch facts regarding their appearance as are ſtated by Mr. Bowles, and for the conſequences to be drawn from them, muſt refer to what has been already ſaid on this ſubject, and to the great book of nature that lies open before us. "I have ſeen, ſays Mr. Bowles, many mountains in Spain with evident ſigns of volcanic conflagrations, no account of which is handed down by record, or even any tradition remaining: between Almagro and Corral in La Mancha, near the river Javalon, on the road to Almaden, pieces of rock may be ſeen with evident marks of fire, and many ſtones rather weighty may be ſeen lying in the fields of a ſooty colour inwardly and outwardly, with all the appearance of having once been in a ſtate of fuſion.

There is a great mountain near the ſea, between Carthagena and Murcia, where there has been a volcano, the aperture of which ſtill remains, and is looked upon by the country people as an inchanted cave; there are five ſimilar ones in the territory of

Murcia, there is one near Carthagena, with viſible remains of an aium mine, having this additional circumſtance for the more readily finding it, that there are four ſprings of hot water near it. The red earth, of Almazarron uſed in the glaſs-houſe at St. Ildefonſo, as well as the other ſpecies of red earth in various parts of Spain, employed for different purpoſes, are undoubtedly produced by volcanos. At the entrance of Cape de Gat there is a mountain towards the ſea, on the ſide next Almeria, conſiſting chiefly, in one part, of ſtone larger than ones arm, cryſtalized in equal layers, delicately fixed to a certain height, of a cinereous colour, as iron was wanting to give them another hue in the fuſion, for their ſhape evinces the effect of having cooled by degrees, according to the laws of cryſtalization; it is true nevertheleſs, that there are ores of a pale colour, with cryſtalized bodies of a perfect white, which are of the claſs of vitreſcents; I have not ſeen them, but Mr. Godin informed me, that he had obſerved ſuch not well cryſtalized, in the high and ſtupendous mountain near Quito, covered conſtantly with ſnow and its bowels in combuſtion, the reſult of a horrible volcano. In Catalonia, between Gerona and Figueras, near the ſea, there are two pyramidical mountains of equal height, whoſe baſes touch, having every appearance of a former volcano; and though at their baſes impreſſions of ſhells are frequently ſeen, they

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are of a later date than the volcano; when theſe petrefactions are found near volcanos they are proofs of their antiquity.

Theſe revolutions in our globe are no where more plainly ſeen than in the mountain of Montſerrat. The ſmall touchſtones ſeen there, in a mountain of a calcareous nature and amidſt thoſe elevated and conglutinated pyramids, being of a black colour and of the ſame grain as the others found in Catalonia, are all from the effects of fire, and have the ſame ferrugineous nature, as the high columns of the extraordinary mountain of Uſſon in Auvergne. Theſe pillars of baſaltes were probably in a ſtate of fuſion with the iron, when they mixed with it, and their irregular ſhape proceeds from having cooled by degrees, like the white baſaltes, if I may be permitted the expreſſion, of Cape de Gat. The ſmall round grains, blue and green, found in the fields near the mountain of Uſſon have been iron. I have ſeen ſome that were metal within, and were formerly like iron ſhot. Their ſhape may be explained from the practice obſerved in iron forges, when the workmen throw a ladle full of fuſed metal on the ground, which runs into a globular ſhape, and is purchaſed by ſportſmen inſtead of ſhot.

The globular iron ore is therefore the product of volcanos as thoſe certainly are near to Ronda and

and Befort in France, both are, as well as thoſe of Germany, with a ſuperficial coat, and give a very ſoft iron. Touchſtones might be made of the pillars of Uſſon, as the Germans do with the baſaltes in different parts of Heſſe and Saxony, whoſe forms are more irregular than the pillars of Uſſon. The Giant's cauſeway and other places in Ireland have innumerable pillars of irregular baſaltes, ſimilar in colour and form to thoſe of Uſſon, which ſerve alſo for touch-ſtones; the black ſoft ſlaty ſtones, found in the Pyrenees of Catalonia, and commonly called *lapiz*, are likewiſe the reſult of volcanos long ſince extinguiſhed.

I think I perceived the remains of a volcano on the mountain of *Serrantes*, near Bilbao, adjacent to the ſea at the entrance of the river of Bilbao; its figure is like a ſugar-loaf, and it has been miſtaken for the mine of Somorroſtro, which is a low uneven hill, at ſome diſtance from this pyramid. Pliny fell into this error, perhaps from not having ſeen it, or from the reports of ſome mariners who traded in Andaluſia, where Pliny was writing his hiſtory.

I never perhaps ſhould have known that the quartz of many mountains of Spain had been calcined, if previouſly, at Gingenbach, in the Black Foreſt in Germany, I had not ſeen them calcine the *Kieſſelſtein* to ſoften and mix it with cobalt, and make

make zaffre; this *Kieſſelſtein* is a true white quartz of the antient volcanos of Spain, but to know and underſtand theſe matters clearly definitions are not ſufficient, they muſt be ſeen."

LETTER XXIII.

Return to Valencia and Caſtile. Mine of ſal gem at Mingranilla. Source of the river Guadiana. Mine of antimony near Santa Cruz de Mudela in La Mancha.

IN going from Barcelona towards Valencia you croſs a fine bridge, lately built, over the Lobregat, at Molino del Rei §; further on, another bridge over a deep valley has been attempted with a triple row of arches at an immenſe expenſe, the foundation has given way, and a long time muſt paſs before it is compleated. The new road was finiſhed in 1778, as far as Villa Franca de Panades. The country is hilly and affords a variety of rural proſpects. The antient city of Tarragona ſtands near the ſea, on an eminence that commands a fine proſpect over a beautiful vale.

§ In the ſecond volume of the Spaniſh tranſlation of Muller's fortifications, there are views of the bridges of Molins, Martorel, Acantara, Almaraz, and Aranjuez.

vale. The city exhibits ſeveral remains of Roman antiquities and inſcriptions. The learned Don Antonio Auguſtin archbiſhop of Tarragona is buried in the cathedral †; proceeding from Tarragona the next town is Reus, a commercial place, which of late years has greatly encreaſed in buildings and population. Here the merchants of Barcelona have their factors and warehouſes, and ſhip

† Don Antonio Auguſtin, archbiſhop of Tarragona, born in 1516, ſon of Don Antonio Auguſtin, vice-chancellor of the kingdom of Aragon, was famous for his writings on canon and civil law and antiquity. All the great men of his age were unanimous in their praiſes of his learning and virtues. He came over to England with Cardinal Pole, and aſſiſted in ſuch regulations as were then drawn up for the purpoſe of eccleſiaſtical diſcipline. Of all his works, none were more eagerly ſought after than his dialogues on antient medals and inſcriptions, "Dialogos de medallas inſcriciones y otras antiguedades ex bibliotheca Ant. Auguſtini archiepiſcopi Tarraçon, en Tarragona, por Felipe May, 1587, 4to. This edition is ſo ſcarce, that Padre Feijoo relates in his *Theatro critico*, that an Engliſh gentleman travelling through Spain offered thirty piſtoles to any one who would bring him a copy, which being complied with, he offered thirty more for another. I ſaw this edition in the library of Don Gregorio Mayans at Valencia; there are only plates to the two firſt dialogues; it has been tranſlated into Latin and Italian; a new edition of it was printed at Madrid in 1744, in the ſame form as the Tarragona edition, and may be had for about five ſhillings. The life of this archbiſhop has been written by the learned Don Gregorio Mayans.

ſhip off their wines and brandies as the ſhips come to an anchor in the road of Salo, about three miles from Reus. Catalonia furniſhes annually thirty-five thouſand pipes of brandy, which require a hundred and forty thouſand pipes of wine to make them, beſides which near two thouſand pipes of wine are alſo annually exported: and of fruit about thirty thouſand bags of hazel nuts every year chiefly for England, and worth about twenty ſhillings a bag on the ſpot.

It is a few hours excurſion acroſs the country to the northward, through Monblanc to the royal convent of Poblet, founded by Alfonſo firſt king of Aragon, in the twelfth century, for monks of Ciſtercian order; the abbot is a temporal baron and has an extenſive juriſdiction, with a conſiderable revenue. Several of the kings and queens of Aragon are buried in the church with ſtately monuments, as well as ſome of the dukes of Medina, celi, and Cardona: on viewing theſe tombs the emotions are only felt by an Engliſhman, that occur when he perceives in an obſcure corner, on an humble ſtone, the name of an Engliſh Peer, Philip duke of Wharton an unhappy nobleman; at the pinnacle of glory in the dawn of life, but alas! whoſe evening was clouded with miſery and ſcorn. After leaving his native country, he meanly crouched to the pretender, aſſumed the inſignia

of

of the order of the garter, bore arms againſt his country: abandoned and deſpiſed by all, he was kindly received in the laſt moments of his wretchedneſs, and was interred by the hoſpitable abbot of Poblet. Thus ended Wharton, an exile and an outcaſt, ſhewing how little availed the higheſt dignities, fortune and talents, without virtue and love for his country. His line is extinct, and the faint inſcription on his tomb, at preſent nearly effaced, will ſoon be totally obliterated, while the energetic lines of Pope, ſo deſcriptive of his character, will hand down his failings as an example to poſterity.*

It is a tedious journey from Reus to Tortoſa, on the banks of the Ebro, where there is a bridge of boats that is croſſed in paſſing to Valencia. I ſhall now reſume the itinerary in going from Valencia towards Caſtile; the ground continues to riſe gradually as far as the chain of hills that divide

* The inſcription on his tomb in the church of Poblet is as follows, and ſaid to be of the duke's compoſition.

Hic jacet Exs. Dom Philipus Warton, Anglus, Dux, Marchio et Comes de Warton, Marchio Marburſiæ et Carlogh Comes Rathcaſrem, vicecomes de Wincheſter Baro de Tramlon Eques Sti. Georgii alias de la Geratera, obiit in fide Eccleſiæ Catholicæ Romanæ Povuleti, die 31. *Maii,* 1731.

vide that kingdom from La Mancha, with a very ſteep aſcent at the *Puerto de Bunol.* Near Utiel the country is covered with dwarf furze called *Erizo* by the Spaniards, from its ſimilitude to the prickles of a hedge-hog: it is a beautiful plant, and at the proper ſeaſon of the year is covered with blue flowers, which give it the appearance of a prodigious amethyſt, forming a cup of three feet diameter, ſo cloſe and firm withal, that a man might ſtand upon it. Cluſius was the firſt who deſcribed and gave a plate of it. It is the *Anthyllis erinacea* of Linnæus.

The aſcent ſtill continues to Villagorda, through a rugged country, broke up every where by gullies occaſioned by torrents that guſh from the mountains. On the higheſt of them there is a quarry of grey marble, veined with red; the river Cabral runs at its foot. At its ſummit there is a briny ſpring, where they make ſalt with a boiling heat. It is a conſtant deſcent from theſe hills to the village of Mingranilla: half a league from the village, there is a diſtrict of limy ſoil, with ſome hillocks about half a league in circumference, having below this bed of lime, a ſolid mine of ſal gem, equal to the ſuperincumbent ſtratum; its depth is not known, for when the excavations exceed three hundred feet, it becomes very expenſive to extract the ſalt; the mine frequently gives way and fills with water, which obliges

obliges them to abandon the ſhaft and work another near it, the whole country being an enormous body of ſalt, ſometimes mixed with a limy ſubſtance, and at others pure or reddiſh, moſtly cryſtaline. Thoſe who have ſeen no other mine might be inclined to think that the limeſtone forms the foſſil ſalt of Spain, but this will not be the caſe, if it is found to be free from lime at Cardona, yet cryſtaline enough to be carved into figures, being much harder than that of Mingranilla, which is brittle like ſpar. §

The ground has been perceptibly carried away by torrents that have diſcovered the mine, for pebbles and hyacinths are diſperſed in the gullies which are now ſeen firmly conglutinated in the lime, forming hard rock, yet leaving no doubt of their having fallen, at ſome period, from the hills, by what may be obſerved on their ſummit.

From hence an eaſy deſcent for about four hours, leads into the extenſive plains of La Mancha,

§ Mr. Bowles ſays, that if the Mingranilla has leſs watery particles in its cryſtalization, it therefore attracts little of the moiſture of the air, and does not diſſolve in a humid atmoſphere like that of ſprings, but this cauſe is hardly admiſſible: ſalt that is cryſtalized with a boiling heat undergoes more or leſs of a decompoſition, is therefore leſs perfect and more diſpoſed to diliqueſce, than that which is formed in circumſtances more favourable to its cryſtalization.

cha, thoſe regions of fancy which Cervantes has rendered immortal. They have plentiful crops of ſaffron at San Clemente, and the beſt that grows in La Mancha. The onion remains four or five years in the ground, producing annually flowers; then the roots are taken up and tranſplanted, and the ſoil becomes excellent for corn, but twenty years muſt paſs before any ſaffron is cultivated again. Caſtile alſo abounds with the deadly carrot, the *Thapſia villoſa* of Linnæus, which according to Cluſius is in great requeſt amongſt old women at Salamanca. *

La Mancha produces great quantities of lavender cotton, ſaid to be the ſame with the famous *moxa* from China, imported conſtantly by the Engliſh and Dutch; while the Spaniards, if this is the ſame plant, have it at home and know nothing of the matter. †

The greateſt part of La Mancha may be conſidered as one continued plain, as far as the eye can extend

* Its uſe may be ſeen in Dr. James's Engliſh diſpenſatory.

† The *ſantolina chamæcypariſſus* of Linnæus. Mr. Bowles ſays it is an excellent ſpecific for the gout, by being burned, on the part. It would have been of ſervice if he had given us any further proof of its efficacy, for whatever they may tell us of the practice in India, and notwithſtanding the praiſes of Sir William Temple, it does not ſeem to be in uſe in England.

extend without a ſingle tree; as the villages are large, and the churches have lofty ſteeples, they make a good figure at a diſtance, but when you draw near, their mud walls with many houſes in ruins convey a quite different idea. The inhabitants, for want of wood, burn thyme, ſouthernwood and wormwood, and though they have few ſprings they conſole themſelves with drinking good wine: when one conſiders their manner of living in theſe ſilent villages, added to their natural ſimplicity, they ſeem to have loſt little of their original character. At Socuellanos they get water about two or three feet from the ſurface; but at Tomilloſo, four leagues further, the wells are a hundred feet deep. From hence it is an hour's journey to Lugar-nuevo on the banks of the famous Guadiana, and only three leagues from its ſource; there are many lakes hereabouts which communicate with each other, produced by ſprings whoſe waters form a river, which having run for ſome leagues diſappears in the meadows near Alcazar de San Juan. In ſummer this river is trifling, but in winter it is neceſſary to go over the bridge at Villarta. The river diſappearing there, ſhews itſelf again a few leagues off, in other lakes called *Ojos de Guadiana*, "The eyes of Guadiana;" from whence the proverbial expreſſion of a bridge where many herds of cattle are conſtantly grazing. To form an idea of ſuch a phenomenon, we muſt ſuppoſe that all the ground

ground in thoſe parts conſiſts of ſome looſe ſubſtance, replete with fiſſures and crevices, to a conſiderable depth, without any ſolid materials to reſiſt the preſſure of the water, by which means the river has leſs water at Lugar-nuevo than within a league of its ſource: after great rains it ſinks ſo much the deeper, and fills all the cellars of the village without any viſible cavity, or paſſage where it might penetrate. On this ſpot called *The Bridge* they have ſunk wells for travellers and cattle, and always find water. When the Guadiana iſſues out of the lakes, it turns ſeveral mills, is a hundred feet broad and about four in depth. It paſſes afterwards by Calatrava, Ciudad Real, Medellin, Merida, Badajoz, and Ayamonte, where it enters the ocean dividing Spain and Portugal. Its ſingular qualities are alluded to in the following epigram of Don Juan de Yriarte, whoſe poems were lately publiſhed at Madrid.

Ales et amnis Anas ſociant cum nomine mores:
Mergitur ales aquâ, mergitur amnis humo.

Before I quit the territory of La Mancha, whoſe fame will never periſh as long as wit and humour remain, I muſt once more inveſtigate the bowels of the earth, and ſpeak of a mine of antimony near Santa Cruz de Mudela, at the foot of the *Sierra Morena*, which ſince 1774 has been ſucceſsfully worked by Don Antonio Sancha, an eminent printer at Madrid,

Madrid, who after having been at a conſiderable expenſe, now gets lumps of regulus of antimony of an enormous ſize, one weighing a hundred and fifty *arrobas*, and many of twenty or thirty, the ſmalleſt of four or five, for which he has a conſiderable demand: he has eſtabliſhed a manufacture of *regulus* of antimony, and has wrought up above ſix hundred *arrobas*, ſo white and cryſtaline, as to look like ſilver, being ſuperior to that of France and Hungary; it is a valuable article in different manufactures, particularly amongſt printers for making types, and is in great requeſt at Madrid, where the art of printing is now brought to a remarkable perfection: they are provided with good letter founders and no foreign types were made uſe of in the elegant edition of Salluſt, tranſlated by the Infant Don Gabriel, his catholic majeſty's brother.

Senſible as I am that much more remains to be ſaid, yet I now cloſe my labours, though not a thouſandth part has been mentioned of what th ſubject affords: moreover the kingdoms of Leon, Navarre, Galicia, and the principality of Aſturias, remain yet to be treated of, which perhaps may be brought forward hereafter, at a more favourable opportunity.

THE END.

APPENDIX.

PART. I.

LETTER I.

WHEN Spaniards ſpeak of a *peſo* only, they mean 15 reals vellon, or a current dollar, an imaginary coin, and not the *peſo fuerte*, or *duro* of 20 reals vellon, an effective coin both in gold and ſilver. This diſtinction however holds good, merely in Spain, for in America they know only the *peſo fuerte*. The dobloon, or piſtole, is alſo an imaginary coin of 60 reals vellon, or three hard dollars, but the *doblon de oro* is a gold piece, worth 75 reals vellon. In currency you find as much American coined money as Spaniſh, particularly ſilver and old gold. In Spaniſh America they have no copper money. Gold and ſilver is coined at Madrid and Seville, copper at Segovia. The new coinage conſiſts of

GOLD.	Reals vellon.
A Gold piece of four piſtoles worth -	300
The half, or double *doblon* - -	150
The *doblon de oro* - - -	75
The gold crown - - -	20
SILVER.	
Madrid ſilver crown, or *peſo duro* -	20
The half - - - -	10
Peſeta - - - - -	4
Real de plata - - - -	2
Realito or *real de vellon* - -	1

COPPER.

Piece of	Two *quartos*.
	One *quarto*
	One *ochavo*
	One *maravedi*, the leaſt coin in Spain.

N. B. A *real de vellon* is worth 8 *quartos* 2 *maravedis*, or 17 *ochavos*.

According to the old coinage, the par of exchange between England and Spain was ſettled at 40 pence ſterling for a Spaniſh current dollar of 15 reals vellon, and this varies in proportion with the balance of trade between the two kingdoms. According to the new coinage, the par may perhaps be leſs. In ſpeaking of the hard dollar in the courſe of this work, I have followed the example of Dr. Robertſon, and fixed it at 4s. 6d. ſterling, which will anſwer every purpoſe of an hiſtorical enquiry.

LETTER V.

Since my return to England, an ingenious correſpondent in Spain has favoured me with the following obſervations relating to the ſalt given to the *Merino* ſheep. "I cannot think Mr. Bowles's account of the quantity of ſalt given to the ſheep exact, for I have two or three times met theſe flocks of *Merinos*, and always aſked the queſtion: ſometimes the anſwer was *Conforme* (a Spaniſh mode of ſpeech when a direct anſwer is not ready) but that meant only with reſpect to weather and the kind of ſoil the ſheep happened to be feeding in. I never found the quantity of ſalt any thing like what Bowles ſays; I underſtand

underſtand that in the northern parts of Spain they give ſalt in ſmall quantities to their oxen, and ſometimes to their horſes."

LETTER VI.

The quantity of land neceſſary to ſow a *fanega* is called a *fanegada*. The fanega meaſure, beſides corn, is further uſed for cheſnuts, beans, acorns, various kinds of ſeeds, fruit, and ſalt. Half a *fanega* is called an *almud* in many parts of Caſtile. 12 *celemines* make one *fanega*, four *fanegas* one *caiz*. A *fanega* of good wheat weighs from 90 to 100 lb. A Spaniſh leaſe cannot exceed 9 ½ years.

LETTER VII.

It is a difficult matter to aſcertain the exact population of Madrid; for its ſize it is populous, perhaps may contain about 150,000 ſouls, ſomething more or leſs.

The longitude of Madrid, according to Don Thomas Lopez, geographer to the king, is found by the moſt accurate modern obſervations to be 13°. 49′. 30″. reckoning from the iſland of Ferro, or 12°. 47′. 30″. from the peak of Teneriffe, from whence Spaniſh navigators reckon their longitude. The Spaniſh aſtronomers who followed the Alfonſine tables, drew their firſt meridian at Toledo. Don Thomas Lopez juſtly cenſures L'Abbe Vallemont, a French writer, for ſaying in his *Elements de l'hiſtoire*, that the Spaniards drew their firſt meridian at Toledo, becauſe Adam was the firſt king of Spain, and that God

placed the ſun over Toledo at the creation; when in fact they only imitated the example of other nations, in drawing their meridian from the place where the firſt obſervations were made, as Ptolomy did at Alexandria, and amongſt the moderns, the Engliſh at the obſervatory at Greenwich, and the French academy at their obſervatory near Paris.

When Mr. Bowles ſays, Madrid is ſupplied with proviſions at all hours, *a todas horas*, it ſeems rather an exaggeration: early in the morning, it is. Madrid is well lighted, but the lamps are not lighted on moon light nights. With reſpect to the invention of Joſeph Lucatelli, mentioned in the philoſophical tranſactions, his machine is called a *ſembrador*, or ſeed box, and at once ploughs, ſows, and harrows, whereby the ſower's labour is ſaved, and the grain falls in order, and in the bottom of the furrow, and remains at the ſame diſtance under ground. There is a plate of it in Mr. Duhamel de Monceau's treatiſe on huſbandry, but as it is liable to many exceptions, particularly in ſtoney countries, and that other improvements have ſince been made of more general utility, it is deemed needleſs to enlarge any further concerning it, as a full deſcription of it is given in the work above-mentioned. See "Practical treatiſe of huſbandry, by Mr. Duhamel de Monceau, tranſlated by John Mills, 1759."

Three or four years ago there was a *zebulo*, or *cibolo*, alive at Aranjuez. In the gardens there are two baſons of water, in one of which a ſmall elephant has water falling out of his trunk, in the other baſon there is a figure of the *zebulo*.

The

The following deſcription of the Creſted Falcon may be added to what has been already ſaid of that bird. "Falco Criſtatus.—Corpus magnitudine gallo-pavonis, caput criſta verticali ornatum, temporum genarumque pennis erectis cinereis, roſtrum aduncum, cera nigra, mandibula inferiore rectiuſcula, dorſum, alæ, gulaque nigræ, abdomen album, cauda faſciis quatuor cinereis tranſverſis: ob animalis ferociam rectrices numerare non licuit. Habitat in *Carracas*. Nulla hujus novæ ſpecici mentio facta eſt a Cl. Linnæo."

LETTER VIII.

The expedition againſt the wild cats at Cuerva, about fourteen leagues from Aranjuez, beyond Toledo, is uſually made when the court is at Aranjuez, at a very great expenſe, perhaps little ſhort of £1000. a cat, as the Rev. Mr. Clarke has related. They are a large mountain cat, not very fierce, and do little more harm than deſtroying ſome game.

A few camels breed at Aranjuez, and many buffaloes, the camels carry burthens, and the buffaloes draw in the carts. The king has a ſtable for his ſtallions called *Caſa de Monte*. The famous jack aſſes called *Burros padres*, are kept at Villa Mayor, about three leagues from Aranjuez, on the road to Toledo.

There are 21 *depoſitos*, or magazines for corn, at Aranjuez; theſe are inverted cones under ground, the earth only cleared out, which will hold 1000 or 1500 *fanegas* each, and preſerve corn dry for ſeveral years.

Amongſt

Amongſt the many fine trees in the gardens of Aranjuez, the lote or nettle tree, the *Celtis* of Linnæus, is one of the moſt beautiful, and is a large tree which has a moſt pleaſing effect.

LETTER X.

St. Ildefonſo gardens, are ſaid to have coſt between ſeven and eight millions ſterling, a great deal of which was expended by the late king Ferdinand the 6th, to perfect the improvements of his royal father.

Amongſt the pictures of St. Ildefonſo, are two Claude's, the drawings of which are in the Duke of Devonſhire's collection, and have been lately publiſhed by Boydel.

Ice to be found in hot weather in moſt parts of Spain, very cheap at St. Ildefonſo, for a farthing a pound. Water ſellers are very numerous every where, always Frenchmen, from Beame, and Gaſcony, who drive aſſes about with barrels of water, the pooreſt Spaniard thinking it beneath him to follow ſo mean a livelihood; but if water is wanted in a glaſs for immediate refreſhment here, the Spaniard ſtretches out his hand, and helps you, and preſents a few carraways to give it a reliſh. Others ſell barley water, and likewiſe a naſty ſweet compoſition called *xarope*.

The method of cooling water, and preſerving it in cellers or caves, was firſt introduced into Spain at Valencia, by Don Lewis Caſtelvi, a gentleman of the emperor Charles Vth; on this account the people of Valencia gave him the name of Don Lewis de la Nieve. In the

reign

reign of Philip IIId, Pablo Jarquies firſt invented a mode of laying a tax upon preſerved ſnow.

The ſtorks leave St. Ildefonſo about the 12th, or generally before the middle of Auguſt, and they come to Madrid about the beginning of February. There are many of them at the eſcurial, not above one or two neſts at Madrid. The ſwallows begin to aſſemble for their departure by the middle of September.

The new altar of fine marbles in the cathedral of Segovia was a preſent from Charles the IIId, and coſt about £8000. ſterling.

LETTER XI.

The *Garvanzo* from Old Caſtile, is a large yellow pea, but not a delicate pea, and never uſed green; is always boiled, and makes part of the *puchero* or *olla*, the favourite diſh which all Spaniards dine upon. This diſh is called *olla podrida*, when it conſiſts of beef, mutton, fowl, ham, pig's feet, garlic, onions, &c. ſo called as every thing is boiled down for a long time; though Andreas Bacio, a Roman phyſician, in his book de *Natura vinorum*, ſays that *podrida* is the ſame as *poderida ſubſtantial*. Such might perhaps have been that *olla* of Vitellius, mentioned in Suetonius, and names *Clypeum Minerva*. See Covarrubias *Teſoro de la lengua Caſtellana*.

The *Berengena* is an eſculent fruit, greatly cultivated in Caſtile, and is alſo a favourite part of the Spaniſh *olla*. They are ſo fond of it at Toledo, that the people there are called *Berengeneros*. This plant produces a fleſhy

fleſhy fruit, about the ſize of a ſwan's egg, of a dark purple on one ſide and white on the other. That ſort which is white is ſometimes called the egg plant. It is the *ſolanum melongena* of Linnæus; in Engliſh, the mad apple. It is ſaid to have ſeveral bad qualities, and that they ſhew themſelves in the face by giving it a livid and dark green colour. It is humourouſly introduced in Don Quixote, ſpeaking of *Thomas Cecial*'s noſe, which beſides being full of warts, was alſo *de color amoratado coma de berengena.* It grows naturally in Aſia, Africa, and America as is commonly eaten by the inhabitants, and was probably introduced into Spain by the Saracens, according to its Arabic name.

LETTER XVI.

The peaches called *pavies* are of the ſort named *amygdalus perſica* by Linnæus, but for a more particular account of them ſee Duhamel on fruit trees.

All fruits grafted though upon their own ſtocks of the ſame kind of fruit improve, as is evident from the grafted cheſtnuts of Spain. The Spaniſh *caſtano* is the *fagus caſtanea* of Linnæus, they graft upon that ſpecies of the family of cheſtnuts which Linnæus calls *fagus caſtanea ſativa.*

LETTER XVII.

In the lordſhip of Biſcay no troops are raiſed in time of peace; in war, every inhabitant without diſtinction is a ſoldier, ſo that the cuſtom of *Quintas*, every fifth man,

man, as in other parts of Spain is not in uſe. They have public armouries in the three provinces of Biſcay, and the arms are delivered out to the men who are exerciſed by experienced officers. They have moreover erected twenty batteries on the coaſt at their own expenſe, and raiſed the regiment af Cantabria. According to the laws or *Fueros de Biſcaya Ley* 5. *tit* 1. the Biſcayners are to ſerve his majeſty at their own charge, they alſo furniſh conſiderable drafts for the navy, and preſent the king with a free gift, in conſequence of which, and their extraordinary courage and fidelity they are freed from taxes, though they pay a patronage to the king as their ſovereign lord, beſides other royalties and tythes; ſo that when every thing is conſidered, the nature of their country requiring the utmoſt ſpirit of induſtry, to cultivate, they contribute a full proportion towards the ſtate as well as their neighbours.

In antient times, when the Catabrians were taken priſoners and tortured by their enemies, they would ſing under the moſt excruciating pains, and bid defiance to their captors as the ſavages ſtill do in North America. At preſent they are a brave and hoſpitable people, famous in peace and in war, as ſtateſmen and ſoldiers, never yielding to fatigue, as Silius Italicus has deſcribed them;

> Cantabar ante omnes hyemiſque æſtu ſque famiſque
> Invictus.

Thus they held out 70 years againſt the Romans in the zenith of their power, and only ſubmitted when Auguſtus came in perſon with his victorious legions, to whom

whom the whole world, known at that time had ſubmitted, as Horace tells the emperor.

Te Cantaber non ante domabilis,
Meduſque et Indus, te profugus Scythes
Miratur, o tutela præſens
Italiæ Dominæque Romæ! Lib. 4. Od. 14.

According to Brantome, the Spaniards were the firſt who were armed with muſkets, and if we believe that writer, they were conſidered as the beſt infantry in Europe Muſkets were firſt uſed by the Engliſh at the ſiege of Berwick in 1521.

LETTER XXV.

The following article was inſerted in the Madrid gazette of the 15th of January 1779: "Many petrifactions of elephants bones are continually found in the excavations made near the bridge of Toledo at Madrid. Two elephants teeth were lately dug up entire, the one about 33 inches long, and the other about half that length. Large pieces have likewiſe been diſcovered which by their ſize ſeem to have belonged to ſix different elephants, of whoſe teeth there are nine pieces and part of the jaws, as alſo the teeth of ſome unknown animal, all which are depoſited in the royal cabinet of natural hiſtory at Madrid."

PART II.

LETTER III.

THE love apples mentioned in this letter, which eſcaped the rapacious tooth of the locuſt, were of the ſecond ſpecies, as deſcribed by Miller, called by the Spaniards *Tomates*, commonly cultivated for ſoups, and uſed in many ſauces, giving them a very agreeable and pleaſing flavour. The *ſolanum lycoperſicon* of Linnæus.

LETTER VIII.

No Engliſh built ſhip of more than 150 tun burthen can go up to Seville. Several Engliſh veſſels go there every year to load oranges. Some go out fully loaded with Engliſh manufactures, others are chartered by the fruit companies in London and ſail in ballaſt, to take any goods that are ready, without waiting for a cargo. They moſt commonly come to anchor at *La Puebla*, a few leagues below Seville, and the fruit is ſent down to them in boats; others go no higher than the Red Cliff, and ſome ſhips load fruit at San Lucar de Barrameda, at the mouth of the Guadalquivir where there is a dangerous bar, and no ſhips can enter without a pilot, ſome ſhips are loaded with Seville oil for the London market, which

which ſells from £30. to £40. ſterling per tun of 236 Engliſh gallons. The iſland of Majorca alſo furniſhes about 7000 pipes of oil annually.

Mr. Guthrie, in his new edition of modern geography for 1780, ſays, that Seville, next to Madrid, is the largeſt city in Spain, which is juſt the reverſe; Seville is larger than Madrid, and this laſt is not a city but only a town, where the royal family principally reſide.

In the cathedral of Seville there are ſaid to be ninety painted windows that coſt 1000 ducats each (about £125. ſterling each) valuing the ducat at eleven reals vellon. The firſt pearls brought from America were preſented to this cathedral, and ſerve to adorn a complete ſet of rich veſtments.

In the ſnuff manufacture abaut 12000 people are ſaid to be employed at five reals vellon per day. They import tobacco from England and work it up with their own, colouring it with red earth called *almagre*, as has been already deſcribed. Their own tobacco coſts them five reals vellon per pound, and is ſold in ſnuff at 32 reals vellon, by which the king is ſaid to clear annually about 600,000 dollars.

Great numbers of buſtards frequent the banks of the river of Seville, the Spaniards call them *abutardas*. Pliny ſays the Spaniards call them *aves tardæ*, from whence it is conjectured that the Spaniſh appellation was their original name, which was given them on account of their ſlow pace and very heavy flying, being large birds; in Scotland they call them *guſetards*.

In

In the ſpring, they catch great quantities of a fiſh near Seville, called *ſavalo*. The ſavil, which at that ſeaſon is reckoned delicate, however the Spaniards think them a moiſt and cold food, as they have a proverb concerning them, *Si no te quieres caſar, come ſavalo por ſan juan*; "If you do not chooſe to marry, eat ſavil at midſummer.

LETTER IX.

Old writers are obſcure in ſpeaking of the river Tinto. Covarrubias, in his *Teſoro*, ſays, it is alſo called river *Azeche*, ſignifying black earth found on its banks, which ſerves to make ink, and is called *Tierra de Sevilla*; Rodrigo Caro, who wrote the antiquities of Andaluſia ſays, a great deal of *azige* grows on its banks, "*Crieſe en ſus orillas mucho azige.*"

LETTER XIII.

Spaniſh horſes have ever been admired for their beauty and agility. The horſe we call a Genriet owes that denomination to the Spaniſh ſchool of horſemanſhip, where the rider, mounted in the mooriſh ſtile, with ſhort ſtirrups and a high ſaddle, is ſaid to ride *a la gineta*. The word *Ginete* is applied to the cavalier and means a horſeman. Thus in the captive's tale in Don Quixote, "Apenas uvo dicho eſto el Chriſtiano cautivo quando el ginete ſe arrojo del cavallo y vino a abraſar el mozo." With theſe ſwift horſes and accoutred *a la gineta*, the Spaniard encounters the bull. See the following books:

Diſcur-

Diſcurſos para eſtar a la gineta con gracia y hermoſura por Don Juan Arias de Avila. Madrid, 1590. 8vo.

Libro de exercicios de la gineta por Bernardo de Vargas Machucha. Madrid, 1600. 8vo.

Exercicios de la gineta por Don Gregorio de Tapia. Madrid, 1643.

Manejo Real por Don Manuel Alvarez Oſorio y Vega Conde de Grajal. Madrid, 1733.

The great ſwiftneſs of the Spaniſh horſes perhaps gave riſe to their fabulous origin, which was humorouſly alluded to by Mr. Addiſon, in one of his papers, in the ſpectator, N° 127, vol. 2. where ſpeaking of the ladies dreſs at that time, he ſays, "Were they like Spaniſh gennets to impregnate by the wind, they could not have thought on a more proper invention."

LETTER XIV.

Mr. Bowles informs us, that after the moſt diligent obſervation in that ſingular range of hills of the *Sierra Vermeja*, he could find nothing which ſeemed to confirm the opinion relating to the ſaliant and reentrant angles of Bourget, and other modern philoſophers, which the Abbate Fortis, in his late travels through Dalmatia ſeems further to have ingeniouſly refuted. "That ſyſtem, ſays he, ſeems to have found more partizans than it deſerved, and ſeveral of them have gained themſelves no honour by adopting it. It was ſufficient indeed to ſtay in their chambers, and to theoriſe at their eaſe on good geographical

phical maps, concerning the truth of the propoſition, *That the ſides of the large vallies, as well as thoſe of the ſhores of the ſea correſpond with one another*, and I, who have taken the trouble to examine many of them, am perſuaded, that *neither the ſides of the ſea ſhores, nor thoſe of the large vallies conſtantly correſpond with each other.*"

Mr. Bowles aſſures us, in his introduction, page 13, That though England, France and Germany abound with chalk hills, he never obſerved the leaſt appearance of any ſuch in Spain, of that ſort deſcribed by Cronſted, under the title of *terra calcaria, pura ſolida friabilis.* Sect. vi.

I could have wiſhed to have laid before my readers a more exact account of the fiſh on the different coaſts of Spain, but this requires a fixed reſidence in the ſea ports; moreover all communication being at preſent interrupted, it has prevented me not only on this occaſion, but on ſome others, from giving more accurate information. Don Bernardo de Ulloa ſays, they catch a ſpecies of fiſh, on the coaſt of Galicia, like our cod, which would be as uſeful as that from the banks of Newfoundland, if any encouragement was given to the fiſhermen.* The beſt ſcallops are catched on the coaſt of Galicia near Compoſtella, inſomuch that on account of their luſcious taſte and other properties, they are ſaid to be in high eſteem with the pilgrims of both ſexes, who reſort to the ſhrine of Santiago at Compoſtella. In former times the Tunny fiſhery

* Reſtablecimiento de las fabricas y comercio Eſpanol por Don Bernardo de Ulloa. Madrid, 1740. This gentleman was father to the preſent Admiral of that name, Don Antonio, de Ulloa, of whom mention is made in the courſe of this work.

fishery was very considerable on the coast of Andalusia, near Conil; but when Don Bernardo de Ulloa, was writing, he complains, that the fisheries that used to bring in a revenue of eighty thousand ducats to the territory of Medina Sidonia was then reduced to eight thousand. The places where they catch the fish, are called *Almadravas*.

Our wine trade with Spain is so considerable, that it has induced me to enumerate the various sorts of wine which that kingdom produces:

Biscay,	Chacoli, -	See page 167 of this work.
Castile,	Vino de guindas,	A wine made with cherries.
	Foncarral, -	A light red wine, and one of the best drank at Madrid, from the village of that name near Madrid.
	Valdepenas, -	A most excellent light red wine, with a very pleasing flavour.

Castile,

Caſtile,	Ciudad Real, -	In La Mancha. The wine from this place praiſed by honeſt Sancho Panza, who loved his bottle.
	La Mancha, -	The light red wine common in La Mancha, and very good.
	Ribadavia, -	An agreeable white wine from the diſtrict of Rioja.
Aragon,	Saragoſſa, -	A rich red wine, very ſtomachick.
	Carinena, -	Another growth with the ſame quality.
Navarre,	Peralta, -	A choice ſtrong white wine.
	Tudela, -	Theſe are all choice wines; there are many others of a more indifferent quality.
	Tafalla, -	
	Falces, -	
	Villa Franca, -	
	Puente de la Reyna, -	

Navarre,	Eſtella, -	A very indifferent wine, which will not keep.
	Arandillo, -	This wine is made with bilberries. It is alſo called *Raſpana.*
Andaluſia	Xerez, -	Our ſherry of the dry ſort.
	Pagarete, -	A more choice ſort of ſherry wine, and very ſtomachick. A moſt excellent wine.
	San Lucar, -	Good wine, but not ſo delicate as the ſherry, though the vineyards of each diſtrict join, owing to its not being made with ſo much attention as by the people of Xerez.

Andaluſia,

Andaluſia	Tinto de Rota,	The wine we call Tent, from Rota, near Cadiz, the word *tinto* uſed for red wine, in oppoſition to white, as with us, the word tint implies colour.
	Montilla, -	A light white wine, much eſteem in Seville.
Granada,	Malaga, -	Our mountain.
	Pedro Ximenes,	A richer ſort of Malaga wine.
	Malvaſia, -	Malmſey, a rich wine ſo called, in imitation of that luſcious wine from Malvaſia, a city of Peleponneſus, in Greece, the antient Epidaurus, from whence this precious wine was firſt imported. This name is given to different growths of wine

Granada,		from Alicant and the Canaries, called ſack in Engliſh, from the Spaniſh word *zaque*, a ſkin to put wine in.
	Marvella, -	A lighter wine than the mountain Malaga; this growth is near the ſea in the vallies.
Valencia,	Tinto de Alicante,	Sweet red wine.
	Benicarlo, -	Strong thick red wine; much of it goes to Bourdeaux, and is mixed with low priced clarets.
	Villa Nova, -	A red wine between the quality of Benicarlo and Mataro.
Catalonia,	Sitges, -	A moſt excellent white wine from the place of that name.
	Garnacha, -	A ſweet red wine.
	Tinto de las Montanas, -	Sweet red wine.

Catalonia,

Catalonia,	Vals, -	A light ſweet wine, which with age becomes dry.
	Matzro,	A coarſe red wine from the town of that name, near Barcelona, ſomething like port. It is often ſold in London.

LETTER XV.

The culture of Barrilla ſeems to be a very old ſtanding at Alicant; Mr. James Howel gives a particular account of it in a letter to Chriſtopher Jones, Eſq; dated from Alicant, 27th March, 1621; wherein he tells him, "I am now (thanks be to God) come to Alicant, the chief rendevouz I aimed at in Spain, for I am to ſend hence a commodity called barrilla, to Sir Robert Manſel, for making of cryſtal glaſs. This barrilla is a ſtrange kind of vegetable, and it grows no where upon the ſurface of the earth, in that perfection as here. The Venetians have it hence, and it is a commodity whereby this maritime town doth partly ſubſiſt, for it is an ingredient that goes to the making the beſt Caſtile ſoap. It grows thus; it is a round thick earthy ſhrub that bears berries like barberries, betwixt blue and green; it lies cloſe to the ground, and when it is ripe they dig it up by the roots, and put it together in cocks, where they leave it to dry many days like hay; then they

they make a pit of a fathom deep in the earth, and with an inſtrument like one of our prongs, they take the tuffs and put fire to them, and when the flame comes to the berries, they melt and diſſolve into an azure liquor, and fall down into the pit till it be full; then they dam it up, and ſome days after they open it and find this barrilla juice turned to a blue ſtone, ſo hard that it is ſcarce malleable; it is ſold at one hundred crowns a tun, but I had it for leſs. There is alſo a ſpurious ſort called *gazul*, that grows here, but the glaſs that is made of that is not ſo reſplendent and clear. I have been here now theſe three months, and moſt of my food hath been grapes and bread, with other roots which have made me ſo fat that I think if you ſaw me you would hardly know me, ſuch nurture this deep ſanguine Alicant grape gives."

LETTER XVII.

From what I have ſaid of Valencia, it may perhaps be thought a picture drawn from imagination, but to ſhew I am not the only writer who has ſounded forth the praiſe of that country, I ſhall add the account given of it by Mr. Howel, in a letter to Dr. Fr. Manſel, dated Valencia, 1ſt March, 1620.

"I am now in Valencia, one of the nobleſt cities in all Spain, ſituated in a large *vega*, or vally above ſixty miles compaſs. Here are the ſtrongeſt ſilks, the ſweeteſt wines, the excellenteſt wines, the beſt oils and beautifulleſt females of all Spain, for the prime curtiſans in Madrid

Madrid and elſewhere are had hence. The very brute animals make themſelves beds of roſemary and other fragrant flowers hereabouts; and when one is at ſea, if the wind blows from the ſhore, he may ſmell this ſoil before he comes in ſight of it, many leagues off, by the ſtrong odoriferous ſcent it caſts. As it is the moſt pleaſant, ſo it is alſo the temperateſt clime of all Spain, and they commonly call it the ſecond Italy, which made the Moors, whereof many thouſands were diſcerned and baniſhed hence to Barbary, to think that Paradiſe was in that part of the heavens which hung over this city."

Amongſt other gay flowers which adorn our parterres, we are indebted to Spain for the muſk roſe, or *roſa ſempervirens*, thus deſcribed by Linnæus:

Roſa ſempervirens. Germinibus ovatis pedunculiſque hiſpidis caule petiliſque aculeatis.

Seed buds egg ſhaped, covered with ſtrong briſtly hairs, as are likewiſe the fruit ſtalks. Stem and leave ſtalks prickly.

The plants of theſe and ſome other kinds of roſes were found growing naturally in Spain, by the late ingenious Robert More, Eſq; of Lindley in Staffordſhire, who ſent the ſeeds to Mr. Miller, who raiſed them in England; the flowers are ſingle, white, and have a ſtrong muſky odour; they appear in Auguſt, and if the autumn proves favourable, will continue in ſucceſſion till October. Miller's gardeners dict.

The

The Spaniſh arum, is the *arum maculatum* of Linnæus, "Wake Robin, cuckow pint, lords and ladies." It is a ſmall plant, common in moſt parts of Spain, particularly in Biſcay. The roots and leaves when recent, are extremely acrid. The root has been employed in medicine as a ſtimulant, but when reduced to powder it loſes much of its acrimony. The French make uſe of the root dried and powdered to waſh their ſkin with, it is ſold at a high price, under the name of cyprus powder, and is an innocent coſmetic. When the acrimony of the roots is extracted, either by boiling or baking, they certainly will afford a mild and wholeſome nouriſhment. Many nations prepare the only bread they have from plants as acrimonious as this, firſt diſſipating the noxious qualities, by force of heat. Starch may be made from the roots. It grows in England in ſhady places, ditch banks and rough grounds. "Dr. Withering's botanical arrangement, &c." There are eighteen varieties of this plant mentioned by Miller, five of which have mild roots, and are eaten by the inhabitants of the hot countries where they grow naturally; ſometimes the leaves are boiled and ſupply the want of other greens, and are eſteemed wholeſome food, in places where the common European vegetables are with difficulty found; but theſe do not include the Spaniſh ſort which Mr. Bowles conjectured might in years of ſcarcity ſerve as a ſuccedaneum to bread.

The *Anchuſa* mentioned by Mr. Bowles is the lithoſpermum of Linnæus, with a red root. The alkanet. In Spaniſh *orcaneta*. The bark of the root tinges wax and oil of a beautiful red. In the northern parts of Europe,

Europe, girls paint their faces with the juice of the root upon days of feſtivity. We have it in England. The gromewell. "See the variety of it in Dr. Withering's botanical arrangement."

I am informed that ſome plants of the *Chirimoya* are now growing in England, raiſed from ſeeds brought from Peru. Fruit cannot be expected from them, but ſhould they flower their exquiſite odour will make ſome amends for that deficiency.

LETTER XVIII.

The Spaniſh poem entitled *Montſerrate*, by Chriſtopher de Virues, a poet of Valencia, is praiſed by Cervantes, in his review of Don Quixote's library, as one of the beſt in that language, equal to the *Araucana* of Don Alonſo de Ercilla, or the *Auſtriada* of Juan Rufo; to all which the Curate gives the following praiſes, "Theſe three poems are the beſt that ever were compoſed in heroic verſe in the Spaniſh language, and may vie with the moſt celebrated poems of Italy; let them therefore be carefully preſerved as the choiceſt ſpecimens of poetry that Spain is poſſeſſed of." Don Quixote, part I. chap. 6.

LETTER XXIII.

Gaſſendi, in his life of Pyreſc, tells a laughable tale of a ſhepherd of Tarragona, of whom he gives the following account, "He reaſoned moreover, touching the engrafting of animals after the manner of plants, upon occaſion of

of a ſloe or bullace tree gowing out of a man's breaſt-bone. A ſhepherd of Tarragona had fallen upon a ſloe tree, and a ſharp point thereof having run into his breaſt, it took ſuch a root in ten years time, that after many branches had been cut off, there ſprung up ſome at laſt which bear both flowers and fruit. Now he (Pyreſc) would never be at reſt till Cardinal Barbarini procured the archbiſhop of that place to teſtify the truth of the ſtory, and the Chevalier Dupuy not only received letters teſtifying the ſame, but alſo certain branches thereof which he ſent unto him. Whoever ſhall ſee ſuch things as theſe, ſays Gaſſendi, may ſafely believe them! Natural hiſtory, in thoſe days, lay yet enveloped in fable; it is to the preſent age we owe ſo many diſcoveries and experiments, which have elucidated and aſcertained the different parts of that uſeful and admirable ſcience. If our neighbours were not enlightened in thoſe days, we alſo came in for our ſhare of their ignorance. When Sir Robert Dudley and Mr. Thomas Cavendiſh ſailed on an expedition to the Weſt Indies, we are told that as ſoon as the Engliſh went on ſhore in the night, obſerving an infinite number of moving lights in the woods, they miſtook them for Spaniards coming upon them unawares, with their firelocks and match-lights; on which they fled in haſte to their ſhips, though it turned out to be nothing elſe but a number of thoſe harmleſs inſects called lanthorn flies. See Hackluyt's voyages, vol. 3.

Travellers have obſerved, that there are no ſwans in Spain, and that you may go for many days together and never ſee a gooſe: if we reflect on the national abhorrence of the Spaniards to the Jews, and to their manners and

and cuſtoms, it may perhaps afford ſome new light to this ſingularity, and account for the want of the latter of theſe birds, from what Dr. Moffet ſays of them from Jaſon Pratenſis, "That the Jews have ſo hard a fleſh, ſo foul a ſkin, ſo loathſome a ſavour, and ſo crooked conditions, becauſe they eat ſo many geeſe." Swans fleſh was forbidden the Jews, becauſe by them the hieroglyphical ſages did deſcribe hypocriſy; for as ſwans have the whiteſt feathers and the blackeſt fleſh of all birds, ſo the heart of hypocrites is contrary to their outward appearance. This latter however, being a prejudice of an innocent nature, might have gained a more general admittance, being merely ſymbolical.

In a review of the moſt remarkable parts of the animal kingdom in Spain, we ſhall find that they poſſeſs the noble Andaluſian horſe, the large aſs, the bear, the lynx, the ravenous wolf, the wild cat, the gennet, the fleet greyhound, and the ſtaunch pointer; alſo the wild boar, whoſe fleſh is ſo dainty, that Strabo ſays, The *Carietes* of Spain, were the beſt makers of ſauſages and wild meats in the whole world. Rabbets were ſo numerous, that they gave their name to the whole country. It has been hinted by Arabic writers, that even the zebra belonged originally to Spain.* They ſeem to have been well known in the days of Cervantes, who frequently alluded to their ſwiftneſs. The *Cebrero* cheeſe has nothing to ſay to this animal, but takes its name from the village of *Cebrero* where it is made, in the biſhopric of Avila, as a corruption of the word *Mons Ciperius*. Perhaps the fine Engliſh

* See Caſiri's bibliotheca arabica Hiſpan. Eſcurialenſis. 2 vols. folio, printed at his Catholic Majeſty's expenſe.

liſh ſpaniel came originally from Spain; what ſhall we ſay of the young Spaniſh puppies, a food once much eſteemed, if any credit is to be given to that writer, who after praiſing the mooſe deer in America adds, "Their fleſh is an admirable diſh beyond that of an aſs's foal, ſo highly eſteemed by the Romans, or of *young Spaniſh puppies, ſo much cried up in our days in England and France.*"†

With reſpect to birds we ſhall find the golden eagle, the vulture, the ſtork, the flamengo, the bee eater, the hoopoe, the buſtard, the beautiful partridge, the becafigo, the ſolitary ſparrow, and others of leſs note. As for inſects the ſilk worm affords them immenſe revenues, the bee yields excellent honey; the inſect from whence they get the kermes has been treated of, and the canthárides, or Spaniſh flies, are well known in our ſhops. Moſchettoes and flies, it is true, are very troubleſome in the daytime, particularly in the ſouthern provinces; but to make amends, the nights are reviving, the ſtars ſhine with infinite brightneſs over your head, while numberleſs glow worms gliſten under your feet. If you walk out in the evening the fields appear enamelled with a variety of flowers, and at every ſtep the green lizard eſcapes from your ſight, as Virgil has ſaid,

Nunc virides etiam occultant ſpineta lacertos.

† New England's rarities diſcovered in birds, beaſts, fiſhes, ſerpents and plants, by John Joſſeline, London, 1672. Dr. Moffet, likewiſe ſays, As for the fleſh of young puppies, commended by Hippocrates and afterwards by Galen, however in the iſles of Corſica and Malta they are ſtill eſteemed as good meat, yet Cardan conſiders them, in his hiſtory, as bad meats, which neither uſe nor reaſon hath confirmed.

The

The following Liſt of Vegetables, growing upon Mount Calpe, or Hill of Gibraltar, is given by way of evincing the Fertility of that Climate.

A.			B.	
ACACIA	June	Back of the hill	Balm, garden	Dec. front
Adder's tongue	Dec.	- - -	Balm of Cappadocia	Apr. - - -
Alder black	Nov.	front	Balm Peru	—— - - -
Ale hoof	Dec.	back	Barbary buſh	Dec. front
Alexander	Nov.	- - - -	Barianas, garden	—— - - -
All heal	Dec.	front	Barley	Dec. - - -
All clown heal	——	on the top	Bay tree	—— - - -
Almond tree	——	front	Bay of Alexandria	—— comm.
Aloe black	——	- - -	Bean, garden	Oct. front
Amomum, the true,	Apr.		- - - horſe	—— - - -
and common	——	back	- - - Malacca	—— - - -
Apple	Apr.	town	Bears breech	Dec. back
Archangel, red and white	——	back	Bears foot	—— - - -
Arrach, garden			Bed, ladies ſtraw	—— comm.
ſtinking	Dec.	back	Beets white and red	Nov. front
Arſe-ſmart, hot and ſpotted		comm.	Behen ——	Dec. - - -
Artechoke	Nov.	front	Benjamin	Nov. - - -
Aſarabacca	Dec.	comm.	Betony, Paul's	Dec. - - -
Aſparagus	——	- - -	- - - - water	—— - - -
Aſſa-fœtida	——	back	- - - - wood	—— - - -
Avens	——	front	Bindweed, green	All the year
			- - - - - rough	—— comm.
			Birdlime	Dec. front

Birthwort

Birthwort long —— - - -
——— round —— - - -
—— wooded running - - —— - - -
Biſhops weed - Dec. - - -
——— cand-weed —— - - -
Bitter ſweet - Nov. front
Blackberry buſh and bramble Dec. comm.
Blites buſh - front
Blue bottle the greater - front
Blue bottle the ſmall - - Dec. - - -
Boxtree, garden —— - - -
Borage - —— comm.
Briony, black - —— - - -
Brook lime - —— front
Broom Spaniſh —— comm.
Buckſhorn plantain - —— - - -
Bugloſs, wild garden - —— front
——— viper - —— - - -
Burdock, gr. garden - —— back of the hill
Burdock, ſmall garden - —— - - -
Butterbur - —— comm.

C.

Cabbage, garden Oct. front
Calamint, mountain - comm.
Calamint water Dec. front
——— common —— garden
Calabaſhes - garden
Calthrops - —— over the hill
Carduus benedictus - - —— front
Cammock - —— back of the hill
——— wild, all the year - - comm.
Camphorata Dec. - - -
Campions - - - -
Carota - —— garden
Caſſia purgens Oct. front
Carrots - Dec. garden
Catmint - Oct. comm.
Centaury, the great, - Mar. front
——— ſmall —— - - -
Chervil - Dec. comm
Chickweed - —— - - -
Citron - —— front
Citrul - Apr. - - -
Clevers - Dec. comm.
Clove gilliflower —— garden
Clover graſs - —— front
Clown's muſtard —— - - -
Coleworts - —— garden
Columbine - —— - - -
Comfrey - —— - - -
Cucumber, garden and wild cauch graſs —— front
Cranebill - comm.
——— muſty - - -

Creſſes

Creſſes -	July	garden
—— water -	Dec.	front
—— wild -	——	comm.
Crowfoot -	Nov.	——
Cuckow flower	Dec.	front
—— tree -	——	——

D.

Daiſy, great -	Dec.	comm.
—— ſmall -	——	——
Dandelion -	——	——
Danewort -	——	——
Date tree -	——	front
Devil's bit -	——	comm.
Dill -	——	——
Dittany, white	——	——
—— Crete	——	——
Dock, common	——	——
—— ſharp -	——	——
Dodder & thyme	——	——
Dog's graſs -	——	——
—— roſe -	——	——
Dropwort -	——	——
Ducks meat -	——	front

E.

Elder - -	Feb.	comm.
Elder, dwarf	Dec.	——
Endive -	——	garden
Eye bright -	Mar.	front

F.

Fennel - -	Dec.	comm.
—— flower	——	gardens
—— hogs	——	comm.
—— giant -	——	——
Feverfew -	——	——
Fig tree - -	Feb.	——
—— water -	——	——
— wort, common	——	
Fetch, - -	Dec.	——
Flagſweet -	July	——
Flax toad - -	Dec.	——
Flax, mountain	——	——
Flower de luce	——	garden
Foolſtones -	Mar.	front
French lavender	——	——
Fumetory -	——	——

G.

Garlick -	Dec.	front
Garvanzas -		garden
Gention - -	——	front
Gliflower, ſtock	——	garden
Gladwyn -	Mar.	front
Goats rue - -	Dec.	comm.
Ground pine -	——	——
Groundſel -	——	——
Gum Arabic -	——	——

H.

Hare's foot -	Dec.	comm.
Hart's tongue	——	——
Hartſwort - -	——	——
Hartſhorn -	——	——
Hedge muſtard	——	front
Hellebore, black	——	comm.

Hellebore,

Hellebore white —— ——
Helmet flower —— back
Henbane - - —— comm.
Herb Robert —— front
Holly, ſea - —— - - -
Holly oak - - —— garden
Honeyſuckle - —— comm.
Horehound - —— back
Horſe-tail - —— - - -
——— tongue - —— front
Horehound, ſtinking - —— comm.
Hound's tongue —— - - -
Houſeleek, great —— - - -
——— ſmall —— - - -

I.

Jacinth - - Dec. garden
Indian corn -
Jejube tree
Jeruſalem cowſlips July front
Jew's ears - Dec. comm.
St. John's wort —— front
St. James's—— —— - - -
Jointed graſs - —— - - -
Ivy

K.

Kidney wort - Dec. comm.
King's ſpear - —— - - -
King's broom front
Knot graſs - Dec. comm.

L.

Lady's bed, yellow - Dec. front
——— mantle May comm.
——— ſmock - - - - - - -
Larkſpur - - Dec. - - -
———ſpike - —— - - -
———cotton - —— - - -
Laurel ſpurge —— - - -
——Alexandrian —— - - -
Leek - - - - - - -
Lentils, garden
Lemon tree - July - - -
Lettuce - Dec. - - -
Lime tree - - - - back
Locuſt tree - - - - comm.
Looſe ſtripe, yellow - May back
Lovage - - Dec. front
Limewort - - - - - - -
——— ſpotted - - - - - - -
Lupine - - - - garden

M.

Maidenhair tree Dec. front
——— Engliſh - - - comm.
Mallow, common - - - - - -
——— marſh - - - - - - -
——— vervain - - - - - -
——— muſk - - - - - - -
——— garden front
Mandrake - - - - - -

Marjoram,

Marjoram, ſweet - - - garden
——— wild - Jan. comm.
Marygold - Dec. garden
Maſterwort - Dec. front
Maſtick - - - - - ———
Maudlin, ſweet - - - ———
Mary weed - - - - comm.
Melon, muſk - garden
Melon, water - ———
Mill mountain Dec. comm.
Mint, cat - - - - - ———
——— ſpear - - - - ———
——— water - - - ———
——— horſe - - - ———
——— pepper - - - ———
Myrtle - - - - - - garden
——— wild - - - back of the hill
Moonwort - - - - - comm.
Moſs tree, all the year
- - - ſea - - Dec. ———
- - - ground - - - ———
- - - of a dead man's ſcull - ———
Mother of thyme - - - front
Motherwort - - - - comm.
Mouſe ear - - - - - ———
Mugwort - - - - - ———
Mulberry tree Feb. garden
Muſtard - - Dec. comm.
Muſhroom - ſouthward and meadow
Muſhorom wild Dec. garden

N.

Navelwort - - Dec. front
Nettle - - - - ——— - - -
——— dead - ——— - - -
Nettle dead ſtinking Dec. front
Nightſhade - - ——— - - -
——— deadly——— - - -
——— woody ———

O.

Olive tree — July front
Onion — — Dec. ———
Opium — — ——— ———
Orange tree - July ———
Ox-eye — — ——— ———

P.

Palm tree — July front
Parſley — — Dec. ———
Piaſt — — ——— back
Parſnep — — ——— garden
——— wild - ——— back
Peach tree — July front
Peaſe — — Feb. garden
Pellitory of the wall of Spain ——— comm.
Pennyroyal - - Dec. front
Pepperwort - ——— ———
Pimento - - ——— ———
Pilewort - - ——— comm.
Pine ground - ——— back

Plough,

Ploughman's Spikenard Dec. front
Poley mountain Dec. comm.
Polypodium - —— ——
Pomegranate - July front
——poppey Dec. comm.
——wild —— ——
——white —— ——
Primroſe — —— ——
Purſlain — — —— garden

Q.

Quincetree — July front

R.

Raddiſh — — Dec. front
Ragwort - - —— comm.
Rocket — — —— garden
Roſe red — ——
—— white — ——
—— damaſk — ——
Rue wild — —— comm.
——goats — —— ——
Rupture wort - —— ——

S.

Saffron — — Dec. garden
—— baſtard —— ——
Sage of virtue —— ——
Sage — — —— ——
Sage-wood - - - - ——
Samphire - - - - - ——
Sabin- - - - - - ——
Savory - - - - garden
Sanders - - - - - front
Sea green houſe leek Feb. ——
Shepherd's purſe Dec. comm.
Sloe tree - - - - - ——
Snake weed - - - - ——
Solomon's ſeal - - - - garden
Sopewort - - - - - front
Sorrel - - - - - - comm.
Sorrel wood - - - - ——
Southern wood - - - garden
Sow thiſtle - - - - comm.
Spignell - - - - - ——
Spinage - - - - - ——
Spikenard - - - front
Spurge - - - - - comm
Starwort - - - - - ——
Sarthiſtle - - Feb. ——
Swallow-wort - - - - ——

T.

Tanſey - - - Dec. comm.
Tares - - - - - - ——
Thiſtle bleſſed Feb. ——
Thyme mother of - - - ——
Thyme - - - - - ——
Toad flax - - - - ——
Tobacco - - Dec. ——
Tomates - - - - garden
Tormentil - - - - front
Thorn - - - - - - ——
Trefoil - - - Dec. all over
Turnep - - - - - front

V.

Vine - - - Feb. comm.
Violet - - - Dec. garden
Viper graſs - - - comm.
Vervain - - - - - front

W.

Wall flower - Dec. garden
Woodbine - - - - - comm.
Woodroof - Apr. ———
Wormwood roman - - - front

They have extraordinary mallow trees, (the ſeeds of which they had from Spain) about two years old, and are now (1778) 14 feet high. They are always green, and flower in April, May and June, ſuppoſed to be unknown in England.

☞ Juſt as I am cloſing this work, I find the following article inſerted in the foreign news-papers, dated Oviedo, April 12, 1780: The Count de Torena and Father Ignatius Buenaza have been employed upwards of a year, by orders of the council of Caſtile, in examining ſeveral mines of ocre and various coloured alum. They have ſince diſcovered an exceeding fine quarry of alabaſter, abounding with the moſt beautiful ſtones, held by the connoiſſeurs to be equal in whiteneſs to thoſe of Mount Taurus. Ours are however larger and more proper for columns and ſtatues. They have alſo examined a mine of jet, the ſtones of which much reſemble thoſe of Calcite. Great quantities of pit coal are found in the neighbourhood of Coboalles. In the diſtrict of Cangas they have diſcovered a mine of ſtones reſembling agate and alabaſter; and in the hamlet of Carroſin they found a cryſtal which has the brilliancy of a diamond. Theſe expert naturaliſts have ſent ſpecimens of all theſe ſtones and minerals to the council.

INDEX OF CONTENTS.

A.

ACIDS, Three in nature compared - 417
Agreda, Town in Caſtile 13
Air of Madrid, Fables relating thereto 71
Alava, Province of 137
Alanis, Town of 320
Albufera, De Valencia 395
Alcanis, Town of 234
Alcora, Manufacture of delf-ware, 233
Eſtabliſhed there by Count Aranda. 401, 402
Alcala, De Henares, city of, and univerſity founded by Cardinal Ximenes. 15
Alcocer, Iron mine between that place and Orrellana. 304
Alfalfa, Or medick, plentiful in Valencia. 404
Algaroba, Or carob tree. 383
Alicant, City of ib.
Huerta de ib.
Almaden, In la Mancha, its famous quickſilver mine deſcribed. 247
Almagre, Uſed at St. Ildefonſo inſtead of Tripoli. 377
Almazan, On the banks of the Duero, ſingular appearance obſerved in that diſtrict. 14
Almazarron, Town of, ſingularities obſerved there. 378
Almeria, City of 356
Alum Mine near Alcaniz, deſcribed. 234
Plume 378
Amber, - - - - - - 389
Amianthus, Or arbeſtus 378
Anduxar, Curious earthen ware made there. 368
Angora, Goats from, introduced into Spain by Charles III. 60
Antimony, Mine of, near Sta. Cruz de Mudela. 447
Ant bear From Buenos Ayres, deſcribed. 80
Aquafortis, Its uſe with ſilverſmiths of Madrid. 418

Aranjuez,

Aranjuez, Gardens and palace deſcribed. 85
Archena, Baths and waters of 379
Arcos, City of 373
Arrobe, Spaniſh weight, 24
Aſphaltos, Or Jewiſh bitumen. 12
Artiſts, Name of Spaniſh, famous for making fine blades. 145
Atienza, Hill of, confines of the two Caſtiles. 14
Auguſtin Antonio, Some account of that prelate. 440
Azure, Or enamel blue. 231

B.

Badajoz, City of 346
Barcelona, City of 406
Cabinet of natural hiſtory —
Barrilla, Harveſt of 378
Different ſorts of that plant. 388
Baſcuenſe Language, ſpoken in Biſcay, ſome account of 185
Batuecas, In Eſtremadura, barren and wretched diſtrict of 288
Bilbao, Town of, and manners of the inhabitants. 182
Biſcayners, Their genius and character. 172
Biſcay, Lordſhip, and its products. 163
Bridge, A place ſo called where the Guadiana diſappears. 447
Burgenſis Paulus, A converted Jew, biſhop of Burgos, his remarkable elevation. 130
Burgos City of 121
Buſtamanta Don Juan de, eſtabliſhes furnaces with alludels at Almaden. 254

C.

Cabinet, Royal, of natural hiſtory at Madrid ſome account of 79
Cabral, River 443
Cadiz, City of 369
Caldas, In Catalonia, baths there. 430
Caldetas Baths of 433
Canal, of Caſtile, intended 153
Cardona, Town of, in Catalonia, ſingular mountain of foſſil ſalt there. 415
Carthagena, Port and harbour of 379
Cervantes, Miguel de Saavedra born at Alcala, author of Don Quixote. 17
Chacoli, Wine in Biſcay. 167
Cinnabar, Native, found in Spain. 253
Clocks, Firſt in Spain, at Seville. 329
Coals, Not conſidered as conſtantly produced from trees, plants or foreſts. 12, 13
Cobalt, Mine of, in the valley of Giſ-

tau, in the Pyrenees of Aragon. 223
Colcothar, Nativa rubra. 377
Columbus, Sails from Palos 334
Commerce, American extenſion of 78
Concud, Village of, in Aragon. 238
Copper mine Of la Platilla. 207
Of Rio Tinto. 330
Near Plan. 225
Cordova, City of 367

D.

Diaz, Rodrigo Diaz de Bibar, called Cid Campeador, ſome account of him. 129
Dories, Or St. Peter's fiſh, why ſo called. 372
Duenas, Singular proverb relating to that place. 125

E.

Ebro, River, ſource of 149
Emery, Different ſorts of 301
Emigrations Of Merino ſheep, inconvenience attending thereon 59
Erizo, Or dwarf furze, firſt deſcribed by Cluſius. 433
Eſtepa, Town of, famous for olives. 364

F.

Falcon, Creſted from the Carraccas, at the Buen Retiro, deſcribed. 84
Feria, Dona Juana de, erects a tomb for her couſin Margaret Harrington at Zafra. 347
Felipe San, Deſcription of its ſituation. 393
Filabres, Mountain of 357
Flamengo, Seen on the Albufera de Valencia. 396
Flint, Uſed to pave the ſtreets of Madrid. 73
Foſſil bones, Remarkable depoſitory of 238
Foſſil ſalt, Mountain of, near Cardona, ſee Cardona.
At Mingranilla 444
Fruits, Variety of, in Valencia. 399
Fuente Garcia, Salt ſpring near it. 221
Fugger, Family from Germany, enrich themſelves in mines of Spain. 248
Full throat, Obſervations on that complaint. 140

G.

Gage, Mr. Grandſon of Sir Thomas, Bart. attends lady Mary Herbert to the ſilver mines of Guadalcanal. 313
Obtains a grant of the mine of Cazalla. 315
Gaeta, In Italy, notion of its rock ſame as at Montſerrat. 414
Gandia, Huerta de, its delightful ſituation. 397
Gat, Cape de, deſcribed. 359

Gayuba, Spaniſh plant, deſcribed. 154
Gennet, Animal peculiar to Spain. 374
Giants Cauſeway, Baſaltes there, compared with that of Monſerrat. 413
Giralda, Moveable figure on a ſteeple, ſo called 328
Gold, Found in the Tagus near Toledo, 222
In the river Jurdes 293
In the river Sil. 294
Gonſalez, Fernan Triumphal arch to his memory. 128
Grana Kermes, Or ſcarlet grain, natural hiſtory of 18
Guadalupe, Sierra de 304
Guadalcanal, In Eſtremadura, its famous ſilver mine 307
Guadalaviar River, paſſes by Valencia; project of deepening its bed. 401
Guadiana, Its ſource 446
Guipuſcoa, Province of 137

H.

Haro, Don Diego Lopez de, Caſtilian general, gains the battle of Las Navas 340
Harrington, Margaret, her tomb at Zafra 346
Herbert, Lady Mary, goes to Madrid, engages to drain the ſilver mine of Guadalcanal. 313
Herradura, Port of, gallies of Spain loſt there. 354
Herrera, Town of 363
Huelva, Town of 333
Juan Sanchez de, ſuppoſed to have firſt diſcovered America. ib.

I.

Jaen, Petty kingdom of 336
Jaſper, Green, of Granada, its virtues. 361
Jews, Of Cordova, their magnificence. 367
Firſt baniſhed England by Edward the firſt. 132
Permitted to return to England by Oliver Cromwell. —
Ildefonſo St. Royal ſeat and gardens deſcribed 114
Iron Mine and forges at Somorroſtro, in Biſcay. 197
Forges, near Plan. 225
Jet, Diſcovered in bituminous wood. 218
Juan, Don Jorge, his monument. 385
Iviza, Iſland of, produces immenſe quantities of ſalt. 387

K.

Kermes, See grana kermes.

L.

Lapis Lydius, Or touchſtone, found on the mountain of Montſerrat 412
Læfling Peter A Swediſh botaniſt, recommended by Linnæus,

goes

goes to Spain and enters into the ſervice of that crown. 113
Lead, Mine of, at Plan. 225
—— in the kingdom of Jaen 337
Vein of, in Sierra Blanca. 219
Black, mine of 322
Lentiſcus, Leaves of, boiled and ſcum ſold for male incenſe. 391
Lichen, —— 350
Locuſts, In Eſtremadura, natural hiſtory of. 274
Lorca, Plains of 377
Loxa, Town of 362

M.

Macias, The poet, his tragical end, 342
Malaga, City of, its environs. 351
Madrid, Obſervations made there. 68
Manna, —— 135
Manriquez, Lady Maria, remarkable ſtory of her. 341
Marble, Curious, at Merida. 272
Malachite, 213
Martorel, Town of, and antient bridge lately repaired. 407
Mata, Lake, where they make ſalt. 387
Medellin, In Eſtremadura, Cortez born at 269
Medina, Sidonia, Town of 373
Merida, City of, its antiquities. 272
Merino ſheep, Method of treating them. 47
Mints, Spaniſh, in America, ſtate of them. 265
Mines, Not always in barren countries 214
Mingranilla, Mine of ſal gem there. 439
Minuart, Don Juan, profeſſor of botany, relieved by the gayuba plant, when on the mountain of Montſerrat. 160
Molibdena, Or black lead. 376
Mondragon, Famous iron ore of 142
Monteſa, Convent of military knights deſtroyed by an earthquake. 392
Montſerrat, Famous mountain of, in Calonia. 407
Morwiedro, Remains of antient Saguntum. 402
Mountains, Reaſon for the uncertain accounts of their origin. 245
Mulberry trees, Method obſerved with them in Valencia. 399
Murcia, Rich vale of 381
Mudela, Santa Cruz de, mine of antimony near it. 447

N.

Navas de Toloſa, Battle of 340
Navarre, Deſcription of furnace there for ſmelting iron ore. 206
Naquera, In Valencia, famous quarry of marble. 402

Negroes,

Negroes, Families of them between Badajoz and Zafra. 346

Ninerola, Quarry of alabaſter there. —.

Nitre, Baſis of, exiſts in the earth and plants.

Nopal, American name of a plant found in the Mexican woods. 31

Novelda, Eſtate of Don Jorge Juan. 386

O.

Oak, ſcarlet, Near Merida, celebrated by Pliny 22

Oak, Varieties of, in Spain. 324

Oak, Propagation of oak timber in Spain, memorial thereon. 188

Oil, Spaniſh method of making it. 365

Onate, Town of 138

Orchilla, See lichen

Orihuela, Boxes made there, and plenty of that country deſcribed. 381

Oyſter ſhells, Remarkable ones between Murcia and Mula. 385

P.

Palos, Port of 335

Pagarete, Wine, 373

Paintings, At Madrid, ſome obſervations on 82

Pamplona, Plants obſerved in the plains of. 8

Paquet boats, Firſt appointed at Corunna, when 58

Pebbles, Remarks on them found in bed of rivers. 420

Perez, Prior of Larrabida, the great friend of Columbus. 335

Pheaſants, Iſland of, Pyrenean treaty concluded there. 141

Phlogiſton, What it is 39

Pholades, ——— 373

Plants, In the neighbourhood of Trilio. 101

Plaſencia, Vera de, and convent of Juſte, where Charles the Vth died. 295

Valley of 297

Plough, New, with ſeed box, introduced by Don Joſeph Lucatelli. 76

Poblet, Royal convent of 441

Population, Sketch of, in Madrid, for 1778. 63

Of Spain. 5

Port St. Mary City of 372

Potatoes, Introduced from America. 352

Puerto, This word implied to mean a paſs, from one province to another. 3

Pyrites, That mineral deſcribed. 218

Q.

Quickſilver, Mine at Almaden,

en, new method of extracting it from the ore, introduced by Don Guillermo Bowles. 256

R.

Rice, Cultivation of, in Valencia. 394
Rivers, Of Spain. 3
Reinoſa, Environs of 149
Rabbet-ſkins tinged } Imitate the beautiful ſkin of the gennet. 374
Revenue to, Crown of Spain on exported wool.
Rhone, River, its diſappearance. 425
Rhine, Cryſtal of the 428
Ripperda, Duke of, confined in Caſtle of Segovia, but eſcapes. 120
Rioja, Province of, ſupplies Biſcay with wine. 167

S.

Saffron, Near St. Clemente, the beſt in La Mancha. 445
Salinas, Hill, ſo called from its briny ſpring. 137
Sailing, Of veſſels, problem relating thereto. 196
Saltpetre, Method of making it Spain. 33
Saltpetre Works, in Paris. 41
Of firſt boiling, at Almeria. 356
Scarlet caps, Dyed with the Kermes exported from Tunis annually. 32
Segovia, City of 119
Seville, City of 328
Sea, Its ſaltneſs conſidered 418
Sierra Blanca, High hill ſo called 218
Singular veins of jet obſerved there —
Sierra Morena, New colonies eſtabliſhed there 349
Simancas, Records of the Kingdom depoſited there by Philip the ſecond. 123
Sheep Spaniſh, } Or Merino flocks. See Merino.
Smalt, —— 231
Spar, Beautiful near Malaga. 353
Solano winds, Dangerous effect of. 328
On young people. 371
Sounding line, Its uſe 429
Statue, Equeſtrian of Philip the IVth at the Retiro, deſcribed. 83
Storks, Return every year to their neſts, many of them at Seville. 328
St. Paul, Bay and harbour of 386
Sunal, Don Joſeph, publiſhed a treatiſe on amber. 389

Tafalla,

T.

Tafalla, City of, cultivation obſerved in its neighbourhood. 9
Tagus, River, its ſource and environs deſcribed. 217
Talavera, Near Merida de la Reyna, in Caſtile. —
La Vieja. —
Tinto River, Extraordinary qualities of 330
Tinplates, Manufacture of, eſtabliſhed near Ronda, by marquis de Pilares. 375
Toledo blades, Particular account of them. 143
Tarragona, City of, its antiquities and pleaſant ſituation. 439
Tortoſa, City of, bridge of boats over the Ebro. 442
Touchſtone, Found in the mountain of Montſerrat. See lapis lydius.
Trillo, Baths and mineral waters of, particularly deſcribed. 93
Types, The elegant tranſlation of Salluſt by Infant Don Gabriel, with Spaniſh types. 448

V.

Valladolid, City of 123
Valencia, Plain of 394
City of 398
Annual products of 404
Valtierra, Village of, mine of ſal gem near it. 10
Velez Malaga, - - 354
Venary, Curious book on, and foreſt beaſts, written by Alfonſo king of Caſtile. 77
Venice, The kermes ſtill uſed there, in the dye houſe, for ſcarlet 22
Venta de Belate, Plants obſerved near that place. 8
Vermeja, Sierra de 376
Villagorda, 443
Volcanos, Remains of antient, in Spain. 434

U.

Urſini, Found in Valencia, different from thoſe ſeen in cabinets. 384

W.

Wharton, Philip duke of, his character, buried at Poblet in Catalonia. 442
Williamſon, Rev. Dr. chaplain to the Britiſh factory at Liſbon, his opinion of Merida and its antiquities. 273
Wingfield, Sir John, the only Engliſhman of note, killed at Cadiz, when taken by the Engliſh. 370

Wing-

Wingfield, Sir Richard, Knt. of the garter, Embaſſador in Spain, buried at Toledo. 370

X.

Xerez, City of, famous for its wine 373
Xixona, Revenue to the inhabitants from the kermes. 24

Y.

Yxquerlat, Arabic word, ſoftened afterwards to *eſcarlata*, in Spaniſh, our word ſcarlet. 22

Z.

Zafra, Town of 346
Zaffre, Deſcribed 227
Zalamea, Town, and its environs 305

Index of Plants mentioned in this Work.

A.

ADELFA 377
Agrimony 9, 218
Alaternus baſtard 412
Altalfa, ſee trifolium Hiſpanicum
Alga 384
Algaroba, or carob 383
Almond ----
Garden 390
Aloe 353
Anis common, ſee pimpernel
Anthyllis erinacea 443
Apple love, ſee tomates
Arbutus uva urſi 137, 154
Archangel 8
Argoma 165
Arſmart 8
Artichoaks 400
Aſparagus, white 353
wild 326
Aſphodel 353
Avens ----

B.

Barrilla 378
Beech 7
maſt bearing 152
Bell flower 214
Bethlem ſtar ----
Bilberry wort 151
Bind weed, rough 412
Birthwort, round 152
Borrage 353
Box 8, 137
Briony black 218
Broom 345
butchers 9
Buckthorn, purging 218
Bullace 9
Butterwort ſweating drops of water 218

C.

Camomile 340
Cantabrian heath 105
Cardomindum 355
Carraſca 22
Carob tree, ſee algaroba
Carrot deadly 445
Cauliflower 400
Cedrats 399
Celandine 8, 353
Ceratonia 383
Cinquefoil 9
Ciſtus, gum bearing 134, 214, 267
dwarf 214
roſemary leaved 391
Clary 353
Coſcoxa, vide carraſca
Coccus ilicis, ibid.
Coſquilla 119
Cork tree 323, 376
Corn flag 214
Cornicabra 381
Coxcomb 152
Crowfoot 8, 9, 268, 282
Cuckow flower 8

D. Devils

D.

Devils bit 9
Ditany baſtard 353
Dock 8, 355
Dock weed 9
Doradilla, ſee golden ſaxifrage
Dragon tree 371

E.

Elder 7, 9
Elm 122
Encina oak 376
Eringo 8
Erizo, ſee anthyllis erinacea
Eſparto, ſee matweed

F.

Fern 412
Figwort 8
Fig 400
Flax 362
Fumitory 353
Furze thorny 137
bitter 283

G.

Garlic 282
Garbanzo 121
Gazul 388
Geranium 353
Goldilocks ----
Gooſegraſs ----
white 9
Gorze, fine 165, 412
Grapes 400

H.

Hare's ear 350
Hawthorn 7, 9, 214
Hemlock 282
Hemp 362
Henbane 9
Holm 7, 214
Horehound, white 9
baſe 214

I.

Jeruſalem oak 122, 123
Iris bulbous 350
Indian fig 353, 355, 397
Juniper tree 214, 412
Spaniſh 221
Judas tree 87

K.

Kermes 19, 137

L.

Lavender 15, 125, 270, 282, 351
cotton 15, 445
Lead wort 124
Lentiſcus 391
Lichen 350
Lichnis 122
Liquorice 91
Lote, or nettle tree 412
Love apple 283
Lucern, ſee trifolium Hiſpanicum

M.

Mallow 283, 353
Marigold, marſh 353
Maſtick tree, common, ſee lentiſcus
Matweed 359
Meadowſweet 127
Medick, ſee trifolium Hiſpanicum
Melons 400
Milkwort 214
Mint 8
Molle, or balſam tree 382
Mulberry tree, black 399
White ----
Muſcari, or fair haired hyacinth 214
Myrtle 351

N.

Nightſhade 353
deadly 282

O.

Oak 10
Variety of 324
Oleander, ſee adelfa
Olive 10, 268
Opuntia 31
Orache 355
Orchilla, ſee lichen
Orchis 137, 214

P.

Palm 381
Palmetto 326
Pear prickly, ſee Indian fig
Penny royal 152
Perriwinkle 350, 351
Peru pepper 382
Pilla marina 384
Pimenton, or guinea pepper 382
Pimpinel, or common anis 218
Plantain 8
Pomegranate 397, 400
Poplar 122
Poppy 9
Privet 152, 266
Mock 412

R.

Ragwort Meadow 125
Ragwort 214
Reſtharrow 9, 391
Thorny 137
Ribes 164
Rice 394
Roſe, wild 8
Roſemary 266, 282, 391, 412
Rue 283

S.

Sage 15
Jeruſalem 125
Tree 214
Salicor 388
Samphire 355
Santolina chamæ cypariſſus, ſee lavender cotton
Saxifrage golden 377
Service 218
Savin 391
Scorpion ſena 412
Scinus molle, ſee Peru pepper
Shepherd's purſe 320
Sorrel 306
Soſa 388
Sowthiſtle 8
Spaniſh cherry 218
Spinage wild 225
Spurge 353
Squinancy berries 152
Shumac 122

T.

Tamariſk 10
Teaſel 9
Thyme 15, 123, 267, 282, 412
Thymus Hiſpanicus 125
Thiſtle, wild, with yellow flowers 127
Thorn tree 8
Thorn apple 7, 355
Tomates 382
Thapſia villoſa 445
Trefolium Hiſpanicum 404
Trefoil, ſtinking 412
Tulip 38
Tuna 31
Tutſan 9

V.

Vipergraſs 9
Vervain, parſley leaved 152

W.

Wormwood, green 123

Y.

Yellow weed 152

N. B. As the liſt of plants growing in the environs of Trillo, with the Linnæan names of them, may be found at page 101, they are not inſerted here.

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